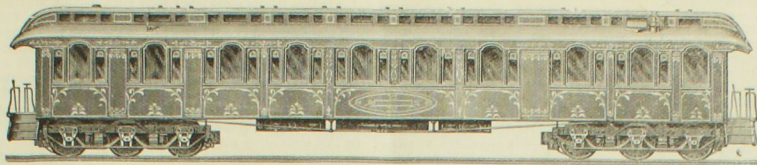


# NATIONAL CAR AND LOCOMOTIVE BUILDER.



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THE Ensign Manufacturing Co., of Huntington, W. Va., have orders on hand for 1,750 freight cars of 25 tons capacity. Their car-wheel and axle trade has more than doubled recently, and all the departments are running to their full capacity.

MR. G. W. TILTON, superintendent of motive power of the Chicago & Northwestern Railway, is having a chemical and physical laboratory fitted up in the shops at Chicago. The intention is to provide the laboratory with all the necessary plant for making accurate tests of all material purchased by the company.

THE New York, New Haven & Hartford R.R. is actively pushing work in the direction of giving greater traveling facilities to people along its line, and of discouraging parallel projects. The laying of four tracks from the Harlem River to Stamford is still in progress, and will be continued right along until Hartford is reached.

THE property of the Gill Car Manufacturing Co., consisting of the works in Columbus, O., and 1,528 acres of coal lands in Athens County, O., was sold under foreclosure May 6 to Edward Nichols, representing the Fidelity Loan & Trust Co. of Philadelphia. The property in Columbus brought \$52,000 and the coal lands \$69,000.

THE American Brake Co. are enlarging their plant at St. Louis by the addition of a warehouse to be used for the storage of malleable iron and heavy castings. This will enlarge their space and make room for a number of new machines now being introduced, and which will increase the capacity of the works over 100 per cent.

A TEST of the Cowell Automatic Combined Hook and Link Coupler was made at Muskegon, Mich., May 19, in the presence of a number of railroad officers who expressed themselves as being perfectly satisfied with the test, and gave orders to have it put on a number of box and gravel cars on the Detroit, Lansing & Northern, and Chicago & West Michigan roads.

THE New York, Lake Erie & Western road has just made contracts with the Buffalo Car Manufacturing Company for 400 hopper bottom gondolas, and with the Youngstown Car (Co.) Manufacturing Company for 400 plain, twenty-five ton gondolas for the N. Y. P. & O. division. An order for 24 first-class passenger coaches is divided up among a number of other companies.

THE Damascus Bronze Co., of Pittsburgh, are building a new foundry 50 x 120 feet, in Allegheny, Pa., in order to meet the growing demand for Damascus bronze. The foundry will be ready for occupation about July 1, and the company's office will be in the Lewis Block. In the new foundry natural gas will be used, and this will be the first establishment in Pittsburgh or in the United States to use this fuel in the manufacture of journal-bearing metal.

THE Union Pacific railway company has commenced the erection of a tie-preserving plant in Laramie City. This plant is the only one of the kind in the west, and one of three in the United States, the others being those of the Atchison, Topeka & Santa Fe road, at Las Vegas, and of the Rock Island road at Chicago. In it the ties are treated by the zinc tanning process of Burnettizing, which makes the soft wood almost as hard as oak and keeps it much longer free from decay.

THE Illinois Central Railroad Company have lately arranged to build 300 freight cars in their own shops, 125 at Chicago and the remainder at McComb City and Water Valley. Mr. Snow, of the Chicago shops, has got his proportion about completed. The cars are 35 feet long, and have journals 4 x 7 inches and wheels 36 inches diameter. They have got such good service out of wheels and axles of these dimensions put under coal cars some time ago, that the company intend using the same sizes under all their new freight equipment. They are putting one set of axles with journals 4 1/2 x 7 inches under a baggage car for trial.

THE handsomest and most comfortable sleeping cars we have ever traveled in are run on the Wisconsin Central Railroad. The company own the cars and manage the sleeping service. The ordinary conductor of the train has charge of the sleeping cars and has a porter in each to attend to the passengers. Although the comfort of traveling in these cars is superior to that provided by any other line of sleepers, the fare is lower than rival lines charge. The cars are higher and wider than other sleeping cars, and a traveler can sit upright in the berths while dressing. With the accommodation provided on this road, a trip through the pine woods and lake lands of Wisconsin is a most enjoyable treat.

It is said that Mr. Martin Irons has expressed himself as thoroughly satisfied with the result of the strike at St. Louis, in the fact that, although the objects for which it was undertaken were not achieved, it ended in an official, or rather governmental, recognition of the Order of the Knights of Labor. Rather a meagre result, we should say, of the loss of life, the interruption to business, and the sacrifice of wealth entailed by his ill-advised direction of a strike that was founded in unreason and injustice. It lasted some months before the recognition that so pleases Mr. Irons was accorded the Order. As to himself, he was very early in the affair recognized at his true value.—*Indus trial Review.*

MR. C. J. IVES, president of the Burlington, Cedar Rapids & Northern Railway, has provided a room in the new offices of the company, at Cedar Rapids, suitable for a night school and reading, to accommodate the men connected with the machine shops. A school and reading room has been organized under the name of the B., C. R. & N. Mutual Improvement Class, under the directorship of R. W. Bushnell, general master mechanic, Allan McDuff being president and E. F. Charles secretary. Wm. Voss, master car-builder, gives the members instruction in drawing, and several other gentlemen have volunteered to give instruction in other branches. The class members are arranging to provide the room with all the leading magazines and technical papers.

MR. C. W. ROSSITER, master mechanic at Livingston, Mont., designed a most convenient arrangement for testing air brake apparatus and for showing engineers in a clear way the operation of the air brake connections. The apparatus is set up against a pillar in the machine shop. On one side appear the pump, engineer's valve, etc., and on the other side the auxiliary reservoir triple valve and gauges are shown. The gauges show the pressure in train pipe, in auxiliary reservoir and in brake cylinder. A triple valve is cut in section and operates in connection with the other triple valve. The heating pipes and radiator of the shop are utilized as a train pipe and represent quite a long train. The whole of the apparatus was constructed from parts picked out of wrecks and from the scrap heap.

THE Chicago limited express on the Fort Wayne division of the Pennsylvania was struck by a tornado on May 15. A flying tree struck the front of the locomotive, smashing the pilot and bending the smoke-stack. The cab was badly damaged, and several of the cars sustained damage from flying debris. Some of the passengers were injured by broken glass, many of the windows having been smashed. The force of the wind struck the train nearly lengthwise, and none of the cars were overturned. After the tornado passed, the damaged engine proceeded with the train. An idea of the force of the wind may be conceived from the fact that stones were blown clear through the window glass as if they had been shot from a gun, and in some places the sheathing of the cars was pierced by the flying missiles.

AN elegant car, just turned out from the Old Colony car shops at South Boston, has been placed on the route between Fall River and Boston. The car is painted brown outside, with gold stripes and gold lettering. The interior is divided, having at one end a drawing-room section, with the seats upholstered in crimson velvet plush. In the center is a small room having a water tank, set marble sink and mirror at one side, and on the other are a small room for the baggage master in charge, and one for a water-closet. At the other end of the car is a compartment for smokers, having the seats upholstered in red leather. The interior woodwork of the car is of cherry, relieved by

panels of bird's-eye maple, and the seat frames are gilded at the ends and the tops are nickel plated. The drawing room compartment has 52 seats, and the smokers' 20 seats.

ANOTHER street car company in Chicago is arranging to introduce the cable system for the propulsion of its cars. Should the change be effected some thirty miles of cable road will be added to that already in operation in Chicago. The new enterprise is promoted by the North Chicago Street Railway Company. The talk is that a cable system will be adopted that will cost much less than that in use on State street. As Philadelphia capitalists control the company, perhaps they intend trying the system that attracted so much attention in Philadelphia lately, and is reputed to have been an extraordinarily cheap cable system. The greatest trouble with that seemed to be that the people who paid their fares and waited patiently for hours while the grip failed to hold, felt much cheaper than the system. A great many Chicago people are beginning to consider themselves and their city too important. By all means give them a cheap grip system.

## A Railway-Tie Nursery.

Hon. R. W. Phipps, Forestry Commissioner for Ontario, has been for several months devoting his time to visiting the principal fruit-tree nurseries and estates, where attention is given to arboriculture for timber and fuel. In a recent letter from southern Kansas to the *Toronto Globe*, he writes:

"One railway board here, knowing that the growing of wood when set about in earnest is neither a slow nor difficult task, has established in Kansas the largest artificial plantation of forest trees in North America. These railway gentlemen themselves gave out the contract for planting over a square mile of land with young seedlings of the catalpa and alantus; and their president, observing the success of their experiment and impressed with its probable excellent financial results, has had planted at his own expense as a speculation as much more. These are situated near the little town of Farlington, Kan. These plantations, now bare of leaves, stretch far over the undulating prairie, in full view of the town. The different sections have been planted, it appears, respectively, two, four and six years ago. About one-fourth is planted with the alantus, the rest with the catalpa, and a few, perhaps a thousand trees, of white ash. Those first planted are now about 25 feet in height, the last about 12. Some of the taller are seven inches through the stem. The first seedlings were brought from Illinois by the car-load—the rest grown in seed beds here. There are in all about 3,000,000 of trees in full growing vigor on these plantations, this calculation leaving out a few on some small portions of poor land, which are not flourishing so well, but will be good trees in time. All were planted four feet apart each way to shade the ground; but eight feet is the ultimate intention, which will allow three-fourths of the trees to be cut out, a thing which can well be done when they are fit for fence-posts, say 7 to 9 inches through; or, if required, they can stay even longer without injuring the plantation. When rather larger it is expected the trees will make excellent railway ties, and at their fuller growth of 15 or 20 years they will supply very valuable timber for cabinet work and house building. Those who have only seen the original forest, with its trees growing at hap-hazard here and there, little ones and big, have but a very vague idea of the large amount of wood the closely-planted groves can spare in their process of growth. This process, partly natural, is also by the art of the planter rendered partly mechanical. Extensive masses of young trees planted in this manner are restricted to but one method of advancement—the endeavor to throw out masses of leaves to the light and air of the upper surface. The lower branches, hidden in shade, rapidly die and fall to the ground, and the plantation becomes a multitude of long, straight stems, full of life and vigor, but only spreading into branch and foliage at the summit. If a tree in youth be crooked it straightens itself, if thus surrounded, as it advances in height. One acre so growing will give of wood, which is all the better taken, quite a number of cords yearly till all the superfluous trees are gone. On each acre here there are 2,000 more trees planted than will ultimately be allowed to attain full growth. There will be left, perhaps, 900,000 to come to maturity, and as these are well as being very useful timber, are fast growing trees, he profits seem likely to be very large."



## Over the Northern Pacific Railroad.

## Editorial Correspondence.

## DIVISION SHOPS.

At convenient points along the line of the Northern Pacific, division repair shops are located between 200 and 300 miles apart. On the Atlantic side of the mountains these shops are all permanent brick structures provided with facilities for doing all the work of their several districts for ten years growth of business, and they are so planned that extensions can be carried out doubling or trebling the capacity of the shops by merely completing the original plan. First-class modern tools are provided in all the shops, and the supply of these is in all cases ahead of the demand. Mr. Cushing pursues the policy of doing all work by machinery, if possible, and where a machine can be used, he believes in employing the best.

There is close uniformity in the design of the various division machine shops, and changes from what is regarded as the most convenient plan are only made to meet physical features of location. A roundhouse is laid out on a circle that will give 44 stalls when complete. The section of this is built that will provide accommodation for the engines doing the business of the locality. At the approach to the roundhouse, the cooling station, sand-house, water-tank and cinder pit are located. At the opposite side of the roundhouse, and about 150 feet distant, we reach the machine shop buildings. They are E-shaped, the main part being nearest the roundhouse. A line bisecting the roundhouse goes through the middle wing of the machine shop. The plain part of the figure is occupied by machine shop and boiler shop, one of the side wings is the blacksmith shop, the other side wing is devoted to car work, and the middle wing provides room for stationary engine, boilers-storage for rough iron, etc. A short way apart from the main building the store house and offices are located, and apart from that again is the oil house convenient to roundhouse and machine shops. No transfer-table is needed with the buildings arranged on this plan.

About half way between the stations where division shops are located there is a subdivision, with roundhouse for taking care of the engines that do not make the long runs.

## THE SHOPS AT MANDAN.

At Mandan, near the eastern crossing of the Missouri River, which was the first division we stopped off at, the shops are of the form described. Mr. A. Bardsley, master mechanic at the place, has four engines undergoing repairs. There is also considerable work in the way of repairing freight cars going on in the car shop. They have a very good tool room at this place, fitted up after the style of the tool room at Brainerd, but on a smaller scale. Although uniformity is aimed at in the plan of buildings and arrangement of tools, the minor arrangements are left to the master mechanics, and we accordingly find diversity of methods and conveniences that reflect the individuality of the men in charge. About sixty men are employed in these shops. In the engine room there is an ingeniously contrived electric fire alarm, invented by the engineer. Connected with the shop whistle is a weight supported by a cord which is attached to a trigger. The trigger is locked by a small electric coil. Breaking the electric connection releases the trigger and lets the weight drop, which pulls open the whistle valve. Connection with this alarm is made by buttons placed in boxes at different parts of the shops and throughout the city.

## THE MISSOURI DIVISION.

Passing westward from Mandan over what is known as the Missouri Division, we traverse more than a hundred miles of rolling prairie land serried by many winding streams. Settlers are fast filling into this locality, and the indications are that within a few years the grassy plains and knolls will be largely converted into fertile fields and inclosed stock farms. The Bad Lands vary the monotony of this division. They are a conglomeration of clay bluffs that have been washed and burned into rugged and fantastic shapes. Books of travel had led us to suppose that the Bad Lands was a region of lifeless desolation, but the reality was quite different. Between the rugged buttes and bluffs there are numerous grass-covered recesses that afford well-sheltered feed for stock. That the region possesses valuable grazing attractions is indicated by the Marquis De Mores having selected a point on the borders of the Bad Lands as the headquarters of his stock-raising and meat-dressing establishment. The Marquis traveled part of a day with our party, and gave us interesting particulars of his stock-raising plans. He believes that the final fattening of cattle will soon have to be done under cover, with prepared food. He is now arranging to build fattening sheds, where the cattle will be fed on selected fattening cereals raised in the vicinity.

## THE FUEL QUESTION.

A great part of Western Dakota and Montana is underlain with vast formations of lignite. Great expectations were based on the advantages that would accrue to the district from the abundance of this fuel. There is reason to believe that the scientists who reported on this fuel have overestimated its value for manufacturing purposes. But it will always give cheap fuel to the settlers, for it can be had almost for the loading up, the seams being exposed in all gulleys and deep water courses.

Mr. R. P. Thomas, superintendent of fuel supply of the

Northern Pacific, who was in our party, gave us many interesting particulars of efforts made to utilize lignite in steam making. It was expected that Dakota lignite could be used by the locomotives running on the Eastern divisions, but carefully conducted trials demonstrated that it would not make steam freely enough even in Wooten fire-boxes, specially designed for burning inferior coal. The analysis who reported on the calorific value of the lignite misled the management. The method followed of testing the fuel was to select a clean specimen of lignite and ascertain the quantity of combustible matter it contained in proportion to refuse. By this means they indicated that lignite must be a very respectable fuel compared to, say, Illinois coal, but when the material was tried in the fire-boxes it fell very far short of the expectations. In mining, large quantities of clay and other incombustible matter got mixed with the true fuel, so that in the quantity put on the tender, less than 40 per cent. is available for heating purposes.

Although the company found they could not burn lignite to advantage alone, they are using it mixed with Ohio coal. Passenger engines receive  $\frac{1}{2}$  through freight engines receive  $\frac{1}{4}$ , and local freight engines  $\frac{1}{2}$  of their supply in lignite.

The locomotives running west of Glendive are supplied with a semi-lignite mined in Montana. This fuel is about equal to Iowa coal and is used unmixed, its greatest drawback being a strong tendency to slack. With the large boilers common to Northern Pacific engines the coal makes steam very freely.

Mines at Carbonado in Washington Territory are turning out a superior quality of coal that is becoming popular on the Pacific coast.

Before Mr. Thomas was appointed to look after the coal supply, there was continual trouble with the inferior grades being put on engines that could not burn it advantageously. His methods of regulating the supply to suit the service has proved highly economical. Last year the quantity used per engine mile was reduced 25 per cent., and the engines pulled 18 per cent. more cars than they did the previous year. This information we had from Mr. Cushing.

## METHOD OF INSPECTION.

Beyond Mandan we stopped over at Glendive, Livingston and Helena on the Atlantic side, and at Missoula, Sprague and Tacoma on the Pacific side of the mountains. The buildings forming all the shops beyond the Rocky Mountains are of wood, and are not intended as permanent structures.

Mr. Cushing makes a thorough inspection of all buildings, machinery, plant and supplies at each place he visits. All the locomotives and cars in the shops are carefully examined. An important feature of his policy of mechanical administration calls for the rigid maintenance of standards and the reducing of odd forms to standard types as fast as the change can be made economically. Seeing that this policy is faithfully carried out by the various master mechanics is partly the aim of the periodical inspections. Several standard gauges are carried for the purpose of testing the accuracy of gauges used in the shops, and a complete set of blue prints are carried to check forms and sizes.

Every master mechanic knows that there will be nothing perfunctory about the inspection that Mr. Cushing will make when he comes along, and his time of coming is very uncertain. They understand that he will go carefully over the engines and cars, examining piece by piece with a close scrutiny that is likely to detect any discrepancy between the real condition of an engine or car and its condition as represented by the monthly reports. He also goes carefully over every house, shop and office belonging to each establishment and examines the condition of all tools and fixtures. Stores and supplies are gone over, and a surplus supply at any point is reduced by transferring to other stations.

During the course of this trip we were surprised to find how many of the workmen and engineers and firemen Mr. Cushing proved himself to be personally acquainted with. In several instances grievances were presented and adjusted. We are persuaded that the policy followed on this road, of encouraging employees to lay any grievances they may have before the head of their department, is calculated to prevent the growth of discontent that so often springs into great proportions from small accumulating wrongs, whose remedy when administered in time would cost little more than a kind word.

## GENERAL INSPECTION OF MACHINERY.

Mr. Cushing's personal inspection of machinery is a recurring check on a thorough system of inspection the rolling stock undergoes constantly while in service from others. The engineers running locomotives are required to carefully inspect their engines at the end of each trip, and the engine is again vigilantly examined in the roundhouse by a machinist. Once every three months a boiler maker gives the boiler a thorough inspection for broken stay-bolts or incipient cracks, and a hydraulic test is made at the same time. The injectors are taken apart and cleaned or any growing defect remedied. The same thing is done with the Westinghouse pump and its connections. Failures of engines on the road are now practically unknown.

Engineers are not permitted to report "injector to be

overhauled" or to make any such vague intimation that work is wanted. They must put down particulars of what they want done, and are not regarded as first-class engineers unless they can do so. This requirement is said to have had an excellent educational effect upon the men.

## EXPENSE OF OPERATING LOCOMOTIVES.

Rigid economy is the strict rule in the use of supplies and material, and ardent emulation prevails among the various master mechanics to make the best possible record. But the mistake is not made of sacrificing efficiency by curtailing operating expenses on the penny wise and pound foolish plan. The rolling stock throughout is in excellent condition and looks remarkably uniform. Although the fuel used is of inferior quality, and the mountain divisions are hard to operate, a recent monthly report shows that throughout the whole line, taking in all kinds of service, 35 miles were run to the ton of coal, 31 miles to the quart of lubricating oil, and 24.7 miles to the quart of all kinds of oil. Repairs cost 8.34 cents per mile, stores 48 cents, fuel 10.51 cents, wages 7.88 cents, the total being 21.61 cents. This includes the whole expenses of the locomotive department. The average passenger train was 6.47 cars, freight 20.74 loaded cars. This is exceptionally high train loads. The expenses for locomotive repairs are remarkably low, considering that extremely bad water is used on a large proportion of the road, which renders boiler repairs abnormally high. On some divisions the boilers have to be washed out every trip. The Nathan boiler washer is used for this purpose, and we heard Mr. Cushing inform Mr. G. Royal, who was in our party, that the device had led to material saving in boiler repairs.

## LOCOMOTIVE EQUIPMENT.

The engines are equipped with all the approved appliances that are calculated to promote economy in operating, or that conduce to the comfort and convenience of the men. Injectors are used exclusively for feeding purposes, the ordinary arrangement being a lifting injector on the right hand side, and a non-lifter on the left. Sight continuous feed-cups are used for oiling the valves on all the passenger engines, and the freight engines are getting them put on. Graduated feeding cups are on all the working parts, including engine, truck and eccentric straps. Certainty in providing oil supply saves no end of repair work. Passenger engines run 50,000 miles and over before valve facing is necessary, an extraordinary result obtained by using good oil regularly supplied.

Some of the engines we examined have made exceptionally good mileage without repairs, and are yet in good order. Engine No. 262, running on the Montana division, has run over 70,000 miles since she left the shop, and the tires are still in such good condition that the engine is expected to make 35,000 more miles before turning is necessary. The division is quite sandy, and this engine has a tubular shield made of Russia iron that encloses the guides. This shield has protected the guides so well that they have not required closing during the long mileage made by the engine, and they still show little wear of cross-head.

A ten-wheel engine is stationed at Helena, on the Rocky Mountain division, to assist trains over the mountains, which are crossed on a long grade of 116 feet to the mile. This engine is worked exceedingly hard, and runs about 95 miles each day. She has been in service 18 months, and the tires still look as if they would run for 18 months longer before they need turning. This is a good record for an engine on the exceptionally hard service of this division. She is handled by a very intelligent and careful engineer who takes pride in his work, and does not slip the wheels when it can be avoided. We rode over the mountain on the engine. Throughout a steady pull for eight miles on the maximum grade, the engine was worked in the 10-inch notch. She steamed freely, although the coal was so badly slack that it resembled screenings. The engineer set the Monitor injector to work as he was pulling out of Helena, and did not touch it till the summit was passed. A blinding snow-storm was raging on the mountains, but there was no slipping of wheels.

Almost every day during the journey, we rode part of the way on some of the engines, and everywhere found that the men did their work as if their hearts were in the business. We noticed that the jet injectors for supplying air above the fire were intelligently worked to suit the condition of the fire, and the fireman operated the dampers, closing them when steam was shut off for a descending grade, or in approaching stations. This was the first time we had seen this practice followed on an American railroad, although it is done universally abroad.

The master mechanics of nearly every division gave us the confidential assurance that each one had the finest set of engines on the road, and that there was nothing could beat them anywhere. The men, on their part, were nearly all disposed to boast of their engines, their road, and their officers. We have come across several roads before where similar sentiments prevail, and in every case the road was economically operated. It pays for the officers to maintain cordial relations with the men, but unfortunately this fact is too often neglected.

## TRACK AND ROAD-BED STRUCTURE.

Throughout the whole 2,000 miles of main line between St. Paul and Tacoma, the track is laid with heavy steel rails resting on close set ties bedded mostly in gravel ballast. The track rides smoothly, indicating that it is well kept up. Surprise has been expressed for several winters back, at the Northern Pacific having no delays



from snow obstruction. A railroad man traveling over the route can readily divine the cause of this exemption from trouble. The road does not traverse regions of deep snow fall, but the battle with the winter elements is won by being prepared for the worst. The policy of prevention has been intelligently followed, but the means of effectually handling the snow, should it obstruct the track, are kept ready. All along the road the banks of small cuttings noted for filling up readily with snow, have been sloped down so that the wind can sweep the track. The larger cuts are protected by snow fences. In every division roundhouse good engines fitted with large snow-plows have been kept ready for snow bucking all winter, and the least indication of a blockade would bring them out in force. Thirty engines were kept ready for this service, but last winter the greater part of them made no mileage whatever. Three or four thousand miles covers the whole of the mileage made by the thirty engines in snow-plow service. All other engines are, during the winter, equipped with a strong pilot plow, which is all that is needed to handle snow four feet deep. There is only one snow shed on the road, and that is merely about 500 feet long. Nothing more of that kind is necessary.

The numerous streams and rivers crossed by the road are mostly spanned by iron bridges, some of them being magnificent structures. The iron truss bridge erected by Mr. G. S. Morrison, C. E., over the Missouri at Bismarck, is one of the finest in the world, and was erected at a cost of over one million dollars. The trestles are all supported on piles, and a few of the highest are of iron, notably the Marcus Gulch trestle, in Montana, which is 886 feet long and 226 high.

In the plains and along the prairie country, the track is level or has light grades and easy curves. Did the business demand it, there would be no difficulty or danger in running the trains at a speed of 50 miles an hour over 95 per cent. of the road. The maximum grade on the passes over the mountains is 116 feet to the mile, and 10 degrees is the sharpest curve. There are only five tunnels on the road, and all of them are short except two that are each nearly a mile long.

#### THE ROUTE.

To a person fond of beautiful scenery, the trip over the Northern Pacific is a continuous source of delight. After passing through the eastern plains of Dakota, the view from the car is a continually changing panorama of scenery varying from the sylvan dale, with its grassy carpet spangled with flowers of every hue, up to the mountain crags piled in prodigious masses thousands of feet above the gorges traversed by the track. Great rivers, somber forests, mirror-like lakes, verdant meadows, foaming cataracts and pine clad mountains unite in forming scenery that is rarely equalled in beauty and grandeur.

Through extended wanderings in many lands, we never before saw a valley that would compare with the Yellowstone River Valley. Six years ago this valley was the richest grazing land, supplying food to countless herds of buffalo. These animals are now practically extinct, and their haunts are filled by steers, horses and sheep. Extensive operations are progressing to irrigate portions of the Yellowstone Valley. Before many years this fine stretch of country will be covered with fertile farms. The Indians struggled hard for many years to retain possession of this region, and as we pass along, the snow-clad mountains south of the valley are recognized as the source of the Big Little Horn where the Sioux gained their last brief victory, and the gallant Custer with his heroic band were annihilated by overwhelming numbers. The upper part of the Yellowstone River leads us into the broken hill scenery that precedes the mountains, whose white peaks are to be seen in the distance. Gradually the higher masses encroach on the line and we enter Livingston with a mountain range at each side and a barrier in front. That barrier is the Belt Range, our first steep ascent.

An interesting point to watch after we cross the Belt Range is the spot where three small rivers join to form the Missouri. At its birth in this rock-bound valley, more than 3,000 miles from its junction with the Mississippi, the Missouri is larger than any British river at its mouth. It is decidedly larger than the Thames or Tay where they reach tide-water. We follow the banks of the Missouri for many miles, and its rapid, clear water presents a wide contrast to the appearance of the Great Muddy, as best known.

After crossing the Belt Range, we seldom lose sight of the mountains, although we travel amidst forests, dales and meadows that sometimes show little of a mountain aspect. At Helena, the beginning of the Rocky Mountain division, we find by the conversation that we are in the midst of a mining region, for the talk is redolent of mining phraseology. Here we begin climbing the divide. On emerging from a tunnel that ends an eight-mile climb, we are beside water that runs into the Pacific ocean.

The route from the divide to Tacoma leads us through some of the most magnificent scenery in the world, and certainly the grandest traversed by a railroad. For a long distance the track follows the course of Clark's Fork of the Columbia river, and the windings of this noble stream reveal new beauties at every turn that are equalled only by the kaleidoscopic-like views seen as the train rushes along the tortuous banks of the Columbia river itself. The stupendous mountains that border the latter stream,

with their rugged pinnacles softened by the clinging pines and glistening waterfalls, present ever varying scenes of savage grandeur.

#### TACOMA.

The town of this name, which is the terminus of the Northern Pacific, is pleasantly situated on the face of a hill overlooking Puget Sound. Although the town contains about 10,000 inhabitants, the houses away from the business part are still surrounded by immense pine stumps that a few years ago carried the trees of an unbroken forest. Before many years pass, Tacoma is destined to become the most important shipping point of the Northwest coast. The largest ships afloat can load at the wharves in a land-locked harbor. Already a good business is done in loading coal and lumber. The day we were there nine vessels were loading lumber, most of them being chartered for Australian ports. One mill employs 235 men and turns out 190,000 feet of lumber daily. They have sawn logs 36 inches square and 120 feet long.

The main Western shops of the Northern Pacific are located at Tacoma, and are in charge of Mr. W. T. Small, assistant superintendent of motive power, who also exercises supervision over all the shops on the Pacific slope. Only sixty men are employed in these shops at present, but there are facilities for working five times that number when business calls for such a force. A great many of the freight cars used on the Western divisions were built at Tacoma, and sufficient work is still done there to keep up the stock. The cheap lumber of the district gives that point material advantages as a car building center, but the advantage of cheap lumber has hitherto been neutralized by labor being dear. Increased facilities of communication are, however, equalizing the price of labor all over the country, and the manufacturing interests of the Pacific Coast will no doubt be benefited by the change.

#### THE GREAT MOUNTAIN.

The deep water of Puget Sound made Tacoma, but the people give no word of praise to their source of prosperity. Their pride and joy is Mount Rainier, now locally called by its appropriate Indian name of Tacoma—the greatest. The location of the town keeps the great mountain constantly before the eyes of the people, and they have good reason to be proud of its magnificent proportions. We looked at the mountain under very favorable auspices. The mountain stands like a huge white cone rising out of low pine-clad foot-hills. The sun had set to the plain, but its rays still glistened on the immense white peak of Tacoma, and the shade creeping over the foot-hills bathed them in dim blue. The spectacle presented was that of an immense conical diamond set in a huge ground of azure.

#### ON THE TRAIN.

West of the Missouri river the train generally consisted of eight or nine cars, well loaded, the policy being followed of not pulling any empty cars. The passenger cars nearly all provide sleeping accommodation. Besides the ordinary sleepers there are generally two emigrant sleepers well filled. The excellent dining car service belonging to the road, besides providing meals on the trains at the usual tariff, supply emigrants with any provisions they want at cost prices. The same service also maintains dining-rooms at the division points, where trainmen and others get good meals for a quarter. This is done at places where saloons advertise that they are ready to sell beer at two "bits" a glass.

The cars throughout the train are very uniform in appearance outside, and are all built in the same way, the only difference being in inside finish. The automatic air brake, with air retaining attachment, is used on all trains, also the Westinghouse pneumatic signaling apparatus. The air retaining valve was adopted as an additional safety precaution in descending the mountain grades. It works perfectly, and there is no difficulty whatever experienced in holding the trains while descending the steepest grades. The locomotives that pass the mountains are all equipped with the Chatelier or water brake, but in passenger service it is seldom used. During the whole of the journey in both directions, we found no indication of a hot box on any car, and there were very few of the wheels with flanges cut, although steel tired wheels are used exclusively in passenger equipment. The tread of the tire is slightly coned, and great care is exercised in putting on wheels to see that they are exactly the proper gauge. Inspection of wheels, to detect sprung axles or other defects, is very closely carried out; and brake shoes of uniform hardness, properly hung, are used. Where cars are running constantly on one division, they are turned round once a month to equalize the wear of tires.

The passenger cars on through trains run from St. Paul to Portland. During the long journey the running gear is subjected to very searching examination at the division stations by car inspectors. All brakes are adjusted by these inspectors. We could perceive none of the trouble so common at stations on many roads, of the brakes holding the train from starting, and we believe the exemption was due to accurate adjustment of rods. They use the hand-brakes to stop each train at one station on each division. This is done to make sure that the hand-brakes shall be kept in working order. While car inspectors are attending to their work at a station, a blue flag is displayed and the train can not be moved till that flag is taken down. A useful practice lately introduced on this road,

is the putting of painted marks on the auxiliary air reservoir to indicate the proper positions of the four-way cock handle.

#### READING ROOMS.

The excellent reading room and library, maintained at Brainerd for the use of the railroad employes, has been already adverted to. At nearly every division point on the road, reading rooms on a smaller scale are maintained, and bath rooms and lavatories are annexed to some of the reading rooms. The master mechanics all take a warm interest in the reading rooms and speak very highly of the good influence these places exert upon the men. At Livingston, the reading room is in a building provided by the city. It receives other support from the city authorities, and is used by the people generally. The success of this institution is due in a great measure to the efforts of master mechanic Rossiter. We understand that Mr. Oakes, general manager of the Northern Pacific, gives free support and encouragement to establishing and maintaining reading rooms, and we are certain that Mr. Cushing does all in his power to help the cause along.

When the employes of a railroad find their officers taking warm personal interest in promoting institutions established for their benefit, it helps very materially to prevent labor demagogues from exerting evil influences over them. After spending over three weeks in close communion with officers and workmen of the Northern Pacific Railroad, we left, convinced that a railroad can be run on the principle of strict economy in all departments, while maintaining the warmest relations between employer and employe. It would conduce to their own material prosperity, it would be good for the interests of the nation, and it would be elevating to the broad cause of human brotherhood, were many more railroads throughout the land managed like the Northern Pacific.

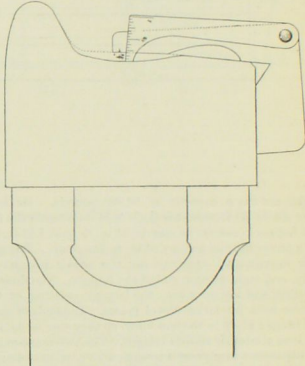


Fig. 1.

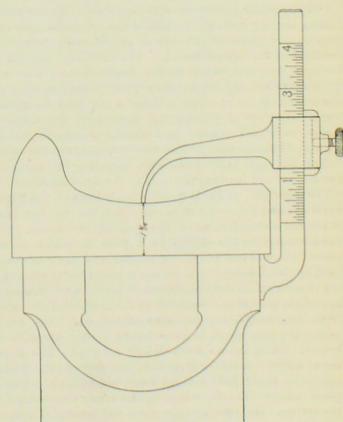


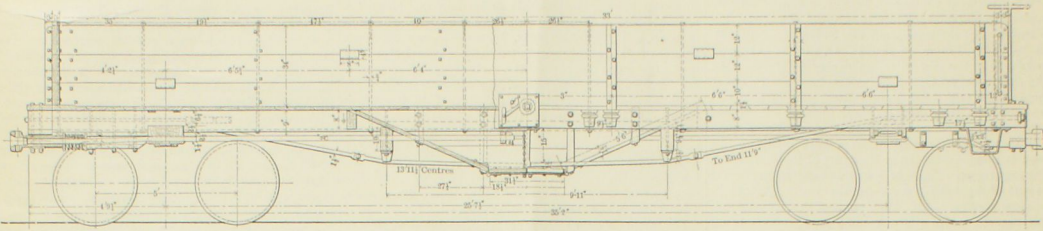
Fig. 2.

#### Gauges for Measuring Wear of Tires.

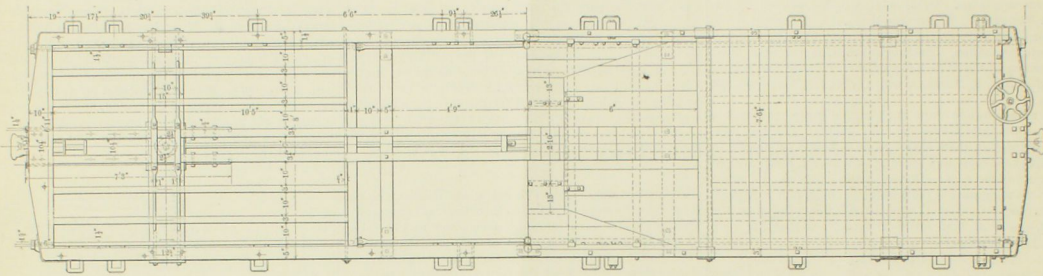
Where a systematic record of the wear of tires is kept, it is important to have gauges which will make the measurements accurately. The gauges shown in the cuts are those used on the Northern Pacific Railroad for car and locomotive tires. Fig. 1 is for measuring the amount of wear. In this gauge a template formed to the standard angle of the tire tread is combined with a movable arm which has a scale to measure the wear. The measuring arm on Fig. 2 slides on a scale. The method of operating the gauges needs no description to practical men.



## HOPPER-BOTTOM GONDOLA CAR—BALTIMORE &amp; OHIO RAILROAD.



Sectional and Side Elevation.



Floor Frame and Floor.

This car has a capacity of 50,000 pounds. Its length over all is 33 ft., and the body is 34 in. deep to the floor. The hopper is as near as may be 24 in. deep and 12 ft. long, with an opening of 5 ft. by 31 in. in the clear. There are four longitudinal sills running the whole length of the body, and eight at each end of the hopper. The floor is 1½ in. thick and the sides 3 in., the latter consisting of three planks held by large dowel pieces. The ends of the car are hinged at B in the end view, so they can be laid flat for long timber or similar freight. The two truss-roads are so disposed as to support a considerable portion of the central weight of the car, without undue strain on the end timbers.

Directly under the center of the car there is a strut which takes a bearing upon the middle of the truss-rod (see end view), at which point the rod is considerably below the bearings at the needle-beams. The ordinary method of taking a double bearing on the needle-beams, not only gives very little support to the car, but brings strains upon the truss-roads out of all proportion to the load sustained. For convenience of putting in, these rods are made in pieces, which are coupled just outside the needle-beams with a pin connection. The two truss-roads of the wood bolster are made in the same way, obviating the necessity for driving and bending the rods at the same time.

The draw-bar, which is continuous, is loose on the 2-inch draw-rod and the strain of drawing is taken by the head of the rod on the bottom of the opening or mouth. The rod is coupled in the center to a yoke in which it has about 10 inches end play. In buffing, the draw-bar slips back on the draw-rod, and unless it sticks badly the rod is not moved unless the link drives it back, in which case it has ample play at the center of the car, which prevents it from being crippled by any blow at the end. The draw-spring is a nest spiral, and the draw-rod runs through its center. There are no draw-spring castings. The draw-bar abuts upon a follower on the outer end of the spring, while the inner follower rests against an oak distance-piece which fills the whole space from the bolster to the spring. By this arrangement the buffing is done on solid timber resting against the bolster. This packing-piece is held fast between the usual draw-timbers, which are secured to the sill by 5 bolts. There are also 4 horizontal bolts going through the packing or distance-piece, and both of the draw-timbers.

The number and dimensions of timber used in the construction are as follows:

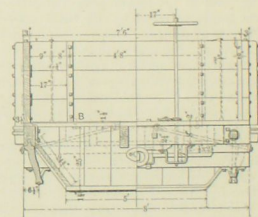
	Inches.	Pt. In.
2 Side sills..... Georgia pine 5	8	34 5
2 Intermediate sills.....	3	8 10 8 1/2
2 Center sills..... white pine 3 1/2	9	33 9 1/2
2 Sides..... Georgia pine 3	34	34 0
2 Ends.....	3	34 2 8
2 Cross sills.....	4	8 7 5 1/2
2 Bolsters..... white oak 5	15	8 0

2 End sills.....	8	10	7 6
2 Tie timbers.....	5	10	8 0
4 Draw-bar timbers.....	4	6 1/2	4 1 1/2
4 Filling timbers.....	3 1/2	6 1/2	2 1 1/2
4 Bolster blocks.....	1 1/2	15	2 9 1/2
2 Furring, under sills.....	2 1/2	10	2 5
2 Foot boards.....	2	10 1/2	8 1
2 Hinge boards.....	2	10	8 1
12 Side stakes.....	3 3/4	4	3 8
4 End cloths.....	2	3	2 10
16 Hopper boards.....	1 1/2	11 1/2	5 6
2 " ".....	1 1/2	12 1/2	10 0
2 " ".....	1 1/2	12 1/2	7 0
2 " doors.....	2	10 1/2	5 3
4 Sill strips.....	1 1/2	5 1/2	6 0
Flooring.....	1 1/2	thick	8 1

## New Canadian Pacific Sleeping Cars.

The first of the new sleeping cars which have been built for the through service on the Canadian Pacific Railway have been received at the Dulhouse Square Station of the Company in Montreal. Some novel features have been introduced which will be appreciated by the traveling public. Chief among these is a bathroom at one end of the car, in which baths can be obtained at a charge of fifty cents at any time during the journey. The first two of the eight cars which have been ordered to commence the service with are named the "Yokohama" and the "Tokio." Instead of the seats used during the day being of the old design, the four center berths are comfortable lounges, which at night time are drawn out to form berths. The center of the car is, therefore, a sort of small hall which can be used as a promenade. The head-rests of the other seats are carried much higher, and so arranged as to afford the greatest possible comfort.

At one end is a smoking-room, with lounges instead of ordinary seats, and at the other end is an exceedingly handsome and comfortable drawing-room, fitted with the usual toilet accessories. All the toilet tables are of Parian marble and the fittings of beaten broze. The cars, like all the new cars on the road, are built of solid mahogany outside, but satinwood, inlaid with brass and mother of pearl, which gives the car a lighter appearance, is used inside. The designs on the ceiling and the upper berths are Japanese, and are exceedingly rich. The ventilators are of colored venetian glass of beautiful shades. Heavy curtains are hung over the windows, which open in both upper and lower berths. The upholstery is in sea green plush, and the floors are covered with the finest Turkey carpet. All the windows are large and afford excellent opportunities for viewing the scenery *en route*, while those of the smoking room are arranged as regular observation windows, reaching far down towards the platform. The buffet will be carried on other cars of the train, so that no unpleasant smell from cooking will permeate the sleeper. The cars were built after designs furnished by Mr. W. C. Van Horne, and are complete in every respect.



Section and End View.

There are also six magnificent new dining-cars being built for the service, which will be shortly delivered. The following is a list of the sleepers now delivered, or in course of delivery, viz.: The Yokohama, Sydney, Tokio, Hong Kong, Canton, Honolulu, Auckland, and Australia. The dining cars have been named, The Marlborough, Osborne, Balmoral, Kensington, Buckingham, and Claremont.—*Railway Life*.

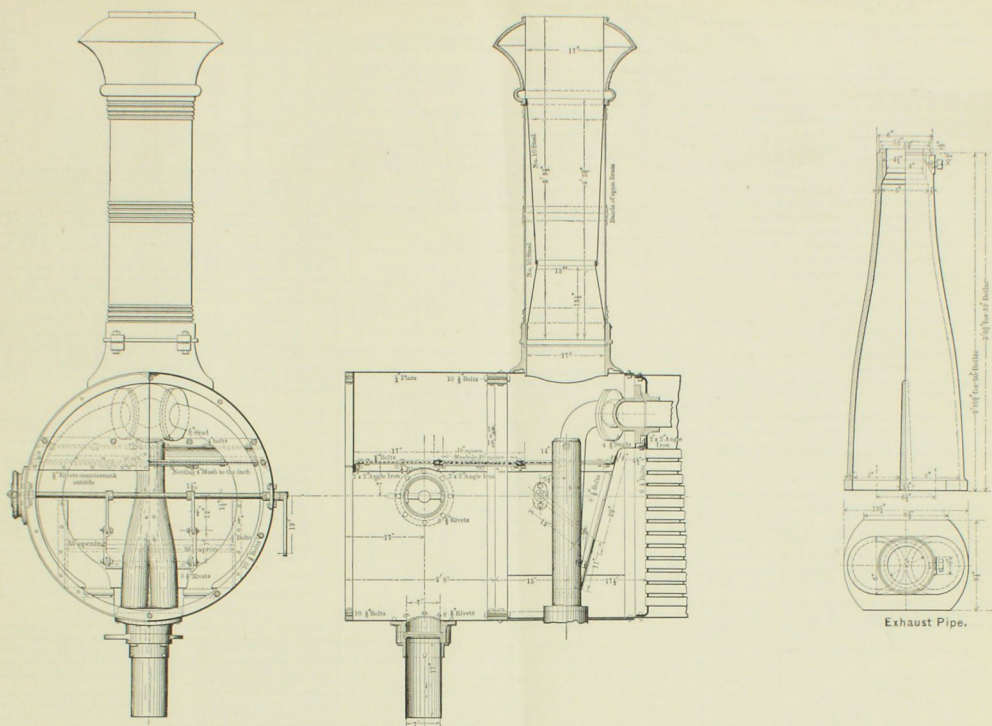
## Canadian Pacific Reading Rooms.

Through the earnest and active efforts of Mr. W. F. Reed, master mechanic, and Mr. A. F. Priest, locomotive foreman of the Canadian Pacific Railway, reading rooms have been established at different points on the line of this road for the accommodation of its employees, and the intention is to increase the number until the company's employees, as a class, will be provided at convenient points with facilities for keeping themselves informed not only upon railway matters, but upon the general news of the day, and will have access to the best literature that can be obtained, ancient as well as modern. At Needing, which is a small place, the library contains 300 volumes of books and a considerable number of prominent daily, weekly and monthly journals, and the treasury is in good condition. An officer of the road writes:

"We have no trouble in collecting dues even from a good many who declared themselves against the undertaking in the first place. Our method is this: The names of all employees are posted plainly on a bulletin board, showing how they stand as regards dues; those in arrears invariably pay up as soon as their attention is called to the fact by the chaffing of their comrades. We have baths attached, beside a smoking-room, with games, etc., to which any employee has access on payment of \$2 per year in advance. We are particularly proud of our success in this undertaking."

The idea of establishing reading-rooms and libraries for the employees of this road originated with Mr. W. F. Reed, master mechanic, and an effort is being made to provide one at all division points. The one at Winnipeg already contains about 900 volumes. Much of the success of this undertaking is due to the efforts of the locomotive foremen of the line, many of these, as in the case of Mr. A. F. Priest, of Needing, having devoted much time and effort to the good work.—*Railway Age*.





EXTENSION SMOKE BOX—CHICAGO &amp; NORTHWESTERN RAILWAY.

The cuts show the style of extension smoke-box in use on the Chicago & Northwestern Railway. They are now equipping all the locomotives belonging to the road with this device as fast as they are taken into the shops for repairs. The device is found highly satisfactory as a spark-arresting device, and the engines having it do their work more economically than they did with the diamond stack and short front end. At first, double nozzles were used, with a small petticoat intervening between the exhaust pipe and the smoke-stack. It has, however, been found that a single nozzle gives better results, and no petticoat pipe is necessary with it. The exhaust pipe is made so that the steam meets no obstruction in passing out by a single nozzle, and no trouble is experienced with back pressure in the cylinders. They find that the required smoke-box vacuum can be maintained with a larger nozzle when the smoke-stack is contracted as shown. The experience of the Chicago & Northwestern people with this form of stack has been similar to that of Mr. Hickey, of the Milwaukee, West Shore & Western Railway, as reported in the February CAR AND LOCOMOTIVE BUILDER. Mr. Tilton and his associates recognize that to make an extension smoke-box successful its joints must be tight, and the work is done accordingly.

#### Baltimore & Ohio Employees' Relief Association.

The fifth annual report of the association for the fiscal year ending Sept. 30, 1885, shows the receipts for the year from premiums, dividends earned on investments of surplus and interest on monthly balances, to be \$29,894. The total disbursements for payment of benefits to members, and for payments to physicians, hospitals, etc., were \$204,448, leaving a gross available balance of \$141,453, and a net balance of \$58,969, after deducting out sundry liabilities amounting to \$58,474, and a reserve fund of \$24,900.

The net balance is considered sufficient to warrant an increase in the natural death benefits of 150 per cent. during the fiscal year ending Sept. 30, 1886, in favor of all those who became members prior to Oct. 1, 1885.

The number of benefits paid from May 1, 1880, to Sept. 30, 1884, was 34,691, costing \$750,807; and the number paid from Oct. 1, 1884, to Sept. 30, 1885, was 10,336, costing \$228,722, making a total of 45,027 payments, costing \$979,529, the average per payment being \$21.75.

The total number of policies issued since the inauguration of the Association (May 1, 1880) is 50,903, of which 4,971 were written during the year—a decrease as compared with the previous year of 2,973. The total number of policies in force, representing the present active mem-

bership, at this date is 16,296—a decrease of 1,410, which is due to the fact that a considerable reduction was made in the company's forces, and that those members leaving the service on this account did not avail themselves of their right to retain their interest in the Association.

The Pension Feature inaugurated on Oct. 1, 1884, has been in successful operation during the past year, and has resulted in placing the names of 111 persons upon its pay-rolls as a reward for their long and faithful service. This fund is entirely supported by the donations of the Baltimore & Ohio Co., and no portion of the sums received from members of the Relief Features are used for this purpose. The value and necessity for the introduction of this feature is fully demonstrated by the year's experience, the majority of those who have been accorded this privilege having been left in their old age and infirmity without other means of support.

#### Railway Master Mechanics' Association.

The following are the subjects for discussion, and the committees appointed to report thereon, at the annual meeting to be held in Boston, commencing June 15, 1886:

*Improvement in Boiler Construction:* Geo. W. Stevens, Wm. Fuller, T. J. Hatswell.

*Standard Driving Wheel Centers and Standard Section of Tire:* J. N. Lander, Jacob Johann, H. N. Sprague.

*Driving Wheel Brakes: To what extent is their use advisable, and Best Method of Application?* J. Davis Barnett, H. A. Whitney, F. M. Wilder.

*Balance Slide Valves:* Charles Blackwell, Jas. Meehan, E. M. Roberts.

*Best Material and Form of Construction for Locomotive Guides and Cross-Heads:* A. J. Cromwell, William Swanson, A. Beckert.

*Best Plan for Removing, Cleaning and Resetting Flues:* Clem. Hackney, A. W. Sullivan, G. H. Prescott.

*Shop Tools and Machinery:* D. A. Wightman, A. J. Pitkin, F. B. Miles.

*Hammer Blow Tests of Locomotives:* William Woodcock, Thos. L. Chapman, Coleman Sellers, Angus Sinclair, F. W. Dean.

*Papers to be read by two Associate Members, viz.:* Robert Grimshaw, John A. Coleman.

In a recent case in Indiana it was decided that a railway company must construct and maintain its roadway and appendages, and overhead structures, in such manner and condition that an employé can do all the duties required of him with reasonable safety; and where they knowingly maintain a bridge over their track so low that brakemen cannot perform their duty on top of the cars, they are liable to a brakeman who, having no knowledge of its dangerous character, is struck by the bridge and injured while in the performance of his duty on top of a car.

#### Master Car-Builders' Association Circulars.

The following circulars of inquiry from committees have been issued from the Secretary's office. The one in reference to End Platforms is dated March 29, and the other has no date. Both were received too late for insertion in our May number:

##### END PLATFORMS OF FREIGHT CARS.

Your Committee on the comparative advantages of the two methods of constructing freight cars—with or without platform timbers or end sills projecting from the end of the car—made a report at the last convention, in which it was shown that of all the cars owned by railroad companies represented in the report, 56 per cent. were in favor of end platforms. It was thought at the convention that if more members had replied to the circular, the statistics would have been different, and the Committee was continued with a view to giving all railroads another opportunity to make reply.

A postal card is inclosed with this circular, upon which you are requested to indicate whether you are for or against end platforms. Members are further requested to read the report of the Committee on page 90 in the proceedings of the Nineteenth Annual Convention, and to advise by letter of any points in favor of either one or the other form of construction that may have been omitted by the Committee in its first report.

The importance to the Association of agreeing upon a standard in this respect, to be followed in constructing new cars, is daily becoming more and more apparent on account of the advent of automatic couplers.

It is hoped that you will take the time to send a reply to the Committee, if not by letter and postal card, by postal card alone.

EDWARD B. WALL, chairman.  
B. K. VERBRYCK.  
GEO. W. CUSHING.  
W. H. HARRISON.  
W. F. TUREFF.  
Committee.

Replies should be forwarded to the Chairman of the Committee, Edward B. Wall, Superintendent Motive Power, Pittsburgh, Cincinnati & St. Louis Railway, at Columbus, Ohio.

##### STANDARD FREIGHT CAR TRUCK.

The Committee on Standard Freight Car Trucks desire to recommend:

First. A standard distance between centres of side bearings.

Second. Forms for body and truck centre-plate bearings.

Will members please advise the Chairman of the Committee what distance they recommend for the first, and send a drawing of the second?

R. MILLER, Chairman, Assistant General Superintendent Michigan Central Railroad, Detroit, Michigan.

##### APPLIANCES TO PREVENT THE SLIPPING OF WHEELS, BOTH PASSENGER AND FREIGHT.

The Committee appointed to report on the above subject request that answers to the following questions be sent to their Chairman as early as possible:

1. Have you used or do you know of any appliances being used to prevent the slipping of car wheels?
2. If so, with what results?
3. What would you suggest as a preventive of the slipping of wheels?

M. P. FORD,  
H. ROBERTS,  
J. P. COULDER.  
Committee.

Answers to the circular should be sent to M. P. Ford, Chairman of the Committee, at Columbus, Ohio.











and after that charge the aforesaid a. r. with modesty. The average runner, instead of being the "modest," "humble" and "patient" mortal so graphically depicted by the G. D., is a different kind of a hair-pin altogether. If he were what the G. D. describes him, he would not tamper with his axle and main rods, his cross-head keys, his driving-box wedges, his injector, his air-brake rigging, and a score of other things that he knows little or nothing about, but would leave such work to competent machinists, to be found in every railroad shop and roundhouse. The average runner runs less risk of his life in taking a train over the road than does the brakeman. The records show that a dozen brakemen are killed to one runner while on duty, take it year in and year out.

The best runners the writer ever knew, during an experience of eighteen years in railroad engineering, were men that could scarcely fill out a trip sheet, or make out a report of repairs needed on their engines, much less read their own writing when two days old. Newspaper writers are wont, from time to time, to dish up a lot of stuff headed "The Romance of the Foot Board," "The Hero of the Throttle," etc., which to the unsophisticated public is gospel truth, but to the practical railroad man of long years of experience is simply nauseating.

The writer of the above is evidently a railroad machinist with a grievance against engineers. His sentiments are not unusual among the class he represents. The machinist who feels disgusted at the engineer being better paid than himself, is generally the man who over estimates his own importance, and the value of the work he is capable of doing. These jealous-minded machinists, so soon as they are able to face a valve, file rod brasses or fit up a set of driving-boxes, imagine that they are the only men of value about a railroad. The writer of the letter quoted and his class forget that they are valuable only for the particular work they do, and it is work as easily learned as the firing of a locomotive properly. It is no argument against the value of the work done by a locomotive engineer or fireman to say that he must work as a common laborer if he cannot find a job at his own calling. Perhaps the machinist who assails engineers would turn printer or engraver if he could not find work at his own trade, but I hardly think he would find any one anxious to employ him at anything above the laboring work he appears to despise.

The great mistake made by the discontented-envious class of machinists is imagining that because they can repair a locomotive, they must be competent to run it. The two capabilities are perfectly distinct callings. If a locomotive were almost certain to break down during every trip, there would be some advantage in having a machinist as an engineer; but as failures to any part of the engine on the road are extremely rare, the machinist is no more useful on the engine than a shoemaker would be. By negatives we may perceive the relative value of engineer and machinist. Every man who knows anything about railroad operating is aware that a bad engineer may cost the company more every day for supplies and wear and tear of machinery than his wages amount to. Can any machinist make himself as undesirable an employe for two weeks without getting fired? Not in ordinary shops.

A machinist is a valuable man in his place, and as a whole machinists are a more intelligent class and better educated than locomotive engineers; but while he remains a mere workman, the world has declared that the machinist's work is not equal in value to that done by the engineer, and the world's verdict is seldom wrong.

ROUNDHOUSE FOREMAN.

#### How the Coal Premium System Works.

##### Editors Car and Locomotive Builder:

Perhaps as good evidence of the fact that the coal premium system will, when properly used and managed, cumulate engine runners to exert themselves as to make a good record in the matter of fuel economy, is contained in the following incident that occurred on our division:

An engineman who had been running on freight for a long time, perhaps twelve or fifteen years, was some time ago given one of our accommodation trains to run. The former engineman had always had a very good record in the consumption of fuel, as well as in other matters, and not a month went by without his drawing a premium. When the new man was put on this run it was soon very evident that his record would be a very poor one as compared with his predecessor's. Each month there was a large excess charged against him. He was reprimanded and talked with, but he invariably replied that he was doing the best he could, and that as the time had been shortened since the other man went off, and there had also been a heavier engine placed on the train, that, taking the altered conditions into consideration, he was doing just about as well as the other man had done when matters were more favorable for the low consumption of fuel than they were now. We thought not, however, and decided upon a course of action the outcome of which would settle the matter.

Our plan was as follows:

The engineman who had formerly hauled this accommodation train was now running a mixed train, and making as good a record on it as he had done on the accommodation train. We, therefore, changed enginemen on these runs, and told the present engineman of the accommodation that if the old runner succeeded in making a premium on his old run, it would be accepted as evidence that the new man had not given this thing the proper amount of attention.

The change was kept up for a month. Both men made premiums on their new runs, and when they were given their old runs the engineman of the accommodation was

told that it had now been demonstrated beyond the shadow of a doubt, that he had been negligent and careless, and that we fully expected that his record for succeeding months must be better. This course of action had the desired effect. The change had been made in the middle of January, and the accommodation engineman knew for a week or so beforehand that it would be made, and therefore reduced his average consumption of coal per mile from 17.4 pounds per mile, the average for December, to 16.0 pounds per mile for the two weeks in January—not much of a drop, but still enough to show that he was making the effort.

About the middle of February he was put back on his old run, and his average for the last two weeks of the month was 11.3 pounds per mile, or a drop of 4.7 pounds per car-mile as compared with the month of December, when he was "knocking it to her," and making no attempt to save coal.

These figures speak for themselves, and comment is unnecessary.

As soon as this engineman saw that we were not only determined to get at the bottom of the trouble, but that his predecessor made about the same record as his old one, even under the new order of shorter time and a heavier engine, he went to work with a will to make his record as good, and succeeded in doing this to a point exceeding his or our most sanguine expectations.

This is not the only case of the sort that has come within the range of our experience. There are quite a number of them, but as it is one of the recent ones we give it for the purpose of showing that the coal premium system can be used so as to produce the most beneficial results.

I.

#### Improving on the Link Motion.

##### Editors Car and Locomotive Builder:

In your "Shop Notes" of the May number some particulars are given about a new valve motion for locomotives, and the assertion is made that enough steam can be admitted while cutting off at 3 inches to do as much work as is now accomplished by a link motion engine while cutting off at 6 inches. I should advise you not to be too sanguine about that improvement. There is a tendency for the agitation in favor of improving on the link motion to work round in circles, and some of us have gone through the ordeal of trying to produce a superior motion, but we all have found after a period of hopeful anticipation that the defective link, with all its bad points, had merely to bide its time to beat our best improvements hollow.

During the last five years the spirit of improvement has been active enough, but it has produced nothing that promises to throw the link motion into the shade. Joy's motion, Strong's valve gear and A. J. Stevens' valve gear have all come out with great claims of making superior distribution of steam, but their work does not seem to materialize. Why, as the immortal Artemus says, is this thus? I would risk to answer—because there is scarcely any margin of possible saving to work on. The reputed purpose of improvers of the locomotive valve gear is to make the locomotive as economical in the use of steam as a good stationary engine. How much margin does this basis give an inventor to work on? The popular voice will say from 25 to 40 per cent., but that is a very great mistake. The difference between a good locomotive in its ordinary working and a good automatic stationary engine does not exceed from 10 to 15 per cent. A recently published work on the Indicator, by Mr. F. F. Hemenway, throws considerable light on this matter; and a comparison of the results shown by reliable experiments with good locomotives, and with good stationary engines, will prove that the difference against the locomotive seldom exceeds 10 per cent.

MASTER MECHANIC.

#### Freight Train Brakes.

A meeting of the Committee of the Master Car-Builders' Association on Freight Train Brakes was held at Harrisburg, Pa., April 28. All the members of the committee except Messrs. Hackney and Welsh were present.

A programme was drawn up for the proposed series of tests to be made at Burlington, Ia., commencing July 13, and also a set of rules governing the tests, both of which were submitted to the following representatives of brake companies who were present at the meeting: Mr. George H. Poor (American Brake Co.); Mr. James H. Slade (Eames Vacuum Brake Co.); Mr. R. M. Agnew (Rote Brake Co.); Mr. John Welsh (Westinghouse Brake Co.); and Mr. W. P. Waldfeld (Waldfeld & Button Brake Co.). The committee also announced that the following companies had expressed their intention to be represented at Burlington at the time above named: The Brown, Eames Vacuum, Rote, Westinghouse, Automatic, and the Waldfeld & Button brakes. The American Brake Co. do not yet formally enter, but would in all probability do so in a few days.

The rules and programme of tests, after some slight modifications, were adopted as given below:

Mr. Rhodes, the Chairman of the Committee, stated that the main object of the Committee was to secure a full and accurate trial of the brakes when in good order, and that in order to save time no tests would be made on coats which were already well-known and admitted. It had been seriously proposed that trials should be made with cars with continuous brakes, such as the Westinghouse or Eames interspersed in a train with cars fitted only with hand-brakes; but as the result was self-evident, it would be mere waste of time to make such a trial, or to try the effect of a compression brake on a train broken in two. Both classes of brakes have admitted defects, and the trials at Burlington were for the purpose of ascertaining what the different brakes could do at their best. Their performance in actual service would be tested in the endurance trial extending over some nine months' service. The trial in April, 1887, would show whether the efficiency of the brakes had deteriorated in actual service. The following is the programme of tests:

#### GENERAL TESTS.

1. Fifty car trains on down grade 54 to 56 ft. per mile, running forward, quick stops.
- a. All cars loaded, 30 and 20 miles per hour.
- b. All cars empty, 40 and 20 miles per hour.
- c. Cars mixed (see below), 40 and 20 miles per hour.
- NOTE.—Half the cars to be loaded and half empty, 75 per cent. of the latter to be on front half of train. During these tests, the rapidity with which a train gets away after a stop will be noted, the time being taken from stop to start.
2. Fifty car trains on level, running forward, quick stops. Same as tests on grade, except that trials are on level.
- NOTE.—In order to attain a speed of 40 miles per hour, pushers or double-headers will be used at option of brake company.
3. A train of fifty (50) loaded cars to be let down a grade of 54 to 56 ft. per mile 3 miles long. Speed of 30 miles per hour at top of grade to be reduced to 15 miles per hour and maintained without material variation all down the grade.
4. Twenty-five (25) car trains. Twelve (12) cars to be loaded, and thirteen (13) empty, about 75 per cent. of empties being on the front half of train. Tests to be made on a down grade of 54 to 56 ft. per mile, running forward at speeds of 40 and 20 miles per hour.
5. Similar trains to above. Tests to be made on level at 40 and 20 miles per hour.
6. Similar trains to above. Tests to be made ascending grade of 54 to 56 ft. per mile, engine in front of train pulling. Speed, about 12 miles per hour.

#### SPECIAL TESTS.

1. Twenty-five car trains. Half the cars to be loaded and half empty, about 75 per cent. of the empty cars being on the front half of the train. Tests on the level. Trains to be broken in half near the centre. Speeds 40 and 20 miles per hour. After the train is broken in two, any assistance necessary will be rendered only by a brakeman who shall be riding at the rear of the train when the breakdown occurs. (See Rule No. 4.)
- NOTE.—In all the above tests, all the cars in a train are fitted with the same automatic brake.
2. Similar trains as above as regards number and loads of cars. One-half of the cars to be equipped with the same automatic brake as the other half with hand-brakes only. Three cars with hand-brakes only next tender, then three with train-brake, and so on. Tests on the level. Speeds, 30 and 20 miles per hour.
3. Twenty-five (25) car mixed trains with the same train brakes on twelve (12) cars next tender. The rear 13 cars to have hand brakes only. Speeds 40 and 20 miles per hour. Tests to be on level.
4. Fifty car trains. Trains to be composed in equal proportions of different train brakes that will operate together. Half of the cars empty and half loaded, about 75 per cent. of the empty cars in front of train.
- NOTE.—No hand-brakes to be used on tests 2, 3 and 4.

#### RULES GOVERNING THE BRAKE TESTS.

1. During the tests each brake company will have the privilege of operating its brakes with its own engine and crew; such as do not wish to furnish a special crew will be furnished from the working crews of the Chicago, Burlington & Quincy Railroad. The engines used others than those mentioned in the rules issued January, 1886, to conform to them in general dimensions and weight.
2. If any of the competitors now signifying their intention of taking part in the tests should fail to be present, the trial will take place provided there are two competitors.
3. The ordinary link and pin coupler shall be used. The link to be of Master Car-Builders' standard dimensions.
4. In operating brakes they must be applied and released by the engineer only, except as specially provided for in Test No. 1, Special Tests.
5. All tests shall be made at least three times by each company.
6. Sand shall not be used in any of the tests.
7. The leverage of the brakes will be recorded by the committee and must not be changed at any time during the tests. This restriction extends over the July tests, the endurance test and the April, 1887, tests.
8. With continuous brakes the pressure carried on the engine prior to the application of the brakes will be recorded for each test.
9. All tests to be made under like conditions of rail, grade, etc., as nearly as practicable.
10. A dynamometer car will be placed in the front end of each train with complete recording mechanism. In the middle box car of each train a portable apparatus will be placed for recording diagrams, showing: 1st, a strain line in pounds exerted on the brake lever during the stops, and 2d, a speed line in miles per hour during each stop. An electric signal will be arranged for communication between the front and rear ends of the train.
11. Competitors will be subjected to all the general tests. Special tests are optional.
12. A referee will be appointed by the Committee empowered to receive and take note of any point of complaint of competitors, and decide the case if the occasion calls for it.
13. The parts pertaining to each brake—other than the foundation-brake—will be painted a red lead color, and so maintained till after the April, 1887, tests.
14. Each car will be fitted with a board lettered: Brake, M. C. B. Test, 1886 and 1887. All repairs or labor spent on parts painted red to be carefully recorded and reported to division headquarters.
15. The trials are subject to the conditions previously issued (Jan. 8, 1886), except so far as they are modified in Rules No. 1 and 2 above.

G. W. RHODES, Chairman,  
GEORGE HACKNEY,  
W. T. HILDRETH,  
JOHN R. LESTER,  
B. WELSH,  
D. H. NEALE, Secretary,  
Committee.

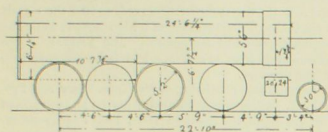
"It," says the *Northeastern Lumberman*, "the general government should for any reason close by force the operation of a railway system, there would be, from one end of the country to the other, an outcry against what would be called despotic and centralized government. And yet a band of dissatisfied workmen can do the same thing for no tangible reason, and meet with considerable sympathy, both in the press and among the people. They do hastily and with comparative impunity what, as Jay Gould well said, the Czar of Russia with all his despotic power would hesitate to undertake."

"The grains of the different woods can be imitated so closely," says a gentleman in the veneer trade, "that there is any amount of deception carried on. Were it not for the high state that this art has reached, the trade in good veneers would be much heavier than it is. Many a lady drums on a piano, the case of which she thinks is covered with rosewood, when it is not. The manufacturers of pianos understand the bogus veneer business thoroughly. They are absolutely certain that no purchaser of an instrument will take a jack-knife and cut into it to ascertain what the case is covered with."

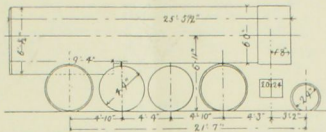


## CONSOLIDATION LOCOMOTIVES.

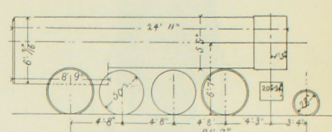
CONSOLIDATION ENGINES. Cylinders 20" x 34".	Tubes.				Fire Box.				Ratios.		Boiler.		Weight.			Drivers.		Wheel Base.			
	Num- ber.	Dia. out- side.	Length.	Fire area.	Outside heating surface.	Inside.		Total heating surface.	Grate to total heating surface.	Fire area to grate.	Dia. outside.	Length to front tube sheet.	On drivers.	On truck.	Total.	Dia.	Drivers.	Total engine.			
						Length.	Width.											In.	Fe.	In.	Fe.
C., B. & Q. (Baldwin).....	198	2	11	0	3.43	1,140	119	33 1/2	138	33	1,378	1:60	1:6.7	56	21	8 1/2	52	14	0	21	7
C., B. & Q. (pro- posed).....	189	2	13	0	3.27	1,285.8	96	34	113.3	22.6	1,369.1	1:61.5	1:6.9	56	21	8 1/2	52	14	0	21	7
Northern Pacific (Baldwin).....	206	2	12	8 1/2	4.72	1,767.6	103 1/2	42 1/2	117	30	1,884.6	1:63.5	1:6.35	60	22	2	49	14	0	21	5
P. R. R. ....	198	2 1/2	12	11	3.92	1,196	96	34 1/2	92	23	1,358	1:54.7	1:5.87	54 1/2	21	8 1/2	50	13	8	21	6
N. Y., W. S. & B. R. R. ....	189	2 1/2	13	5 1/2	3.68	1,340	95 1/2	34 1/2	112	23.3	1,452	1:62.3	1:6.33	55	21	9 1/2	50	14	0	21	7
P. & R. R. R. ....	197	2	11	6 1/2	3.49	1,190	114	96	167	76	1,357	1:17.8	1:21.2	56	21	8 1/2	50	14	9	22	10



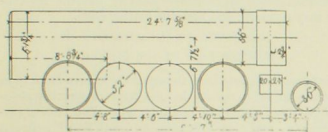
C. B. &amp; Q. R. R. (Baldwin.)



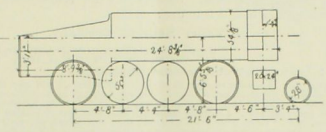
Northern Pacific R. R. (Baldwin.)



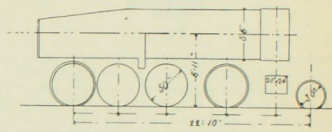
West Shore R. R.



C., B. &amp; Q. R. R. Proposed.



Pennsylvania R. R.

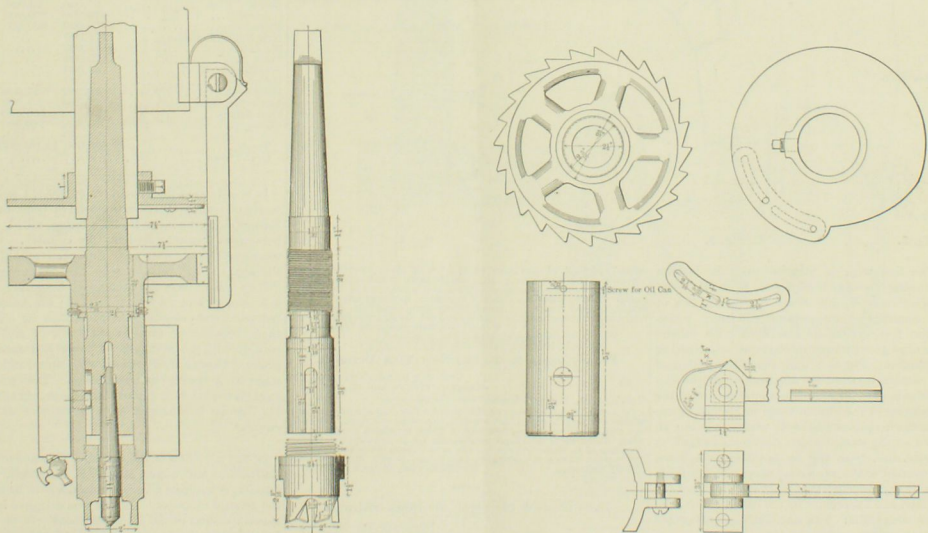


Phila. &amp; Reading R. R.

The mechanical department of the Chicago, Burlington & Quincy Railroad, while scheming out the details of a new consolidation engine lately, obtained particulars of the boiler and a few other leading dimensions from roads that had used this type of locomotive with conspicuous success. The above cuts show the principal outlines of a few of the engines, and we also give in tabular form the detailed particulars.

The French Government has decided to discard the use of wooden ties on the State Railways, and to gradually substitute metal ones. The Minister of Commerce has invited tenders for 25,000 steel ties to begin with; but it is calculated that 4,300,000 will be required every year for fifteen years before the whole of the existing mileage will be replaced. At present prices this means an expenditure of about \$8,000,000 per annum upon steel.

The inability of the Maine Central Railroad repair shops to keep up with the increase of rolling stock, and the fact that the road has had to hire some repairing done within the past year, have determined the directors of the road to build entirely new repair shops of a capacity to constantly employ 135 hands. The shops will be either of brick or stone, and their location is now under consideration by a committee of directors.



FLUE-HOLE BORER—C. ST. P., M. &amp; O. RY.

The device represented in the engravings was gotten out in the tool room of the Chicago, St. Paul, Minneapolis & Omaha Railway shops at St. Paul. It is applied in an ordinary drill press, and does its work without requiring the sheet to be previously drilled with small holes. With this form of cutter, twelve or fourteen holes can be drilled an hour. Mr. Ellis, Master Mechanic of the road, regards this form of hole cutter as the best ever invented. Several heads contributed toward perfecting the device, and it is not covered by patent.

A SPECIAL train that was recently run over the Union Pacific Railroad with President Adams maintained a speed over sixty miles an hour throughout a long run. The engine had only five feet drivers. It had an extension front and large single exhaust nozzle.

We have in our Chicago office turnings 4 inches wide and 1/8 inch thick, cut from steel tires in a lathe they have in use in the Northern Pacific shops at Brainerd. The turning tool takes in the whole tread and flange at the same time.

MR. JOHN HARRINGTON, of Coventry, Eng., is the manufacturer of a new form of seat spring, which is applied, among other things, to the seats of railway carriages. The entire seat is carried on a coiled steel spring of peculiar form, and is most luxurious, being free to move in all directions, so that every jerk and oscillation which the carriage can receive is perfectly taken up. The spring is on exhibition at the Royal Aquarium, Westminster.

The Laconia Car Co., at Laconia, N. H., have a contract to build 50 platform cars for the Boston & Lowell Railroad.



## The Shaver Non-Electric Telephone System.

The cuts illustrate a new system of telephoning which has been recently introduced. It is known as the Shaver system, and is especially adapted to short lines not exceeding two miles. The cost of construction is very much less than that of the Bell telephones, and the wire is hung so as to avoid the trouble met with in previous systems in carrying it round angles. This makes the system a very convenient one for transmitting messages between railroad offices, shops and freight yards, in the matter of orders car numbers, weights, and various other things in the general run of business. The telephone is of the acoustic class, which requires no electricity, and many of the defects of other acoustic systems have been avoided. A sharp rap or two on the transmitter, instead of the ringing of a bell, makes the call.

The principal points claimed for this invention are as follows: An exceedingly thin and sensitive diaphragm of membrane is used, covered with a secret composition for

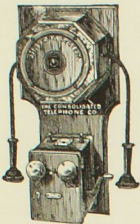


Fig. 1.

checking the resonance, and to prevent deterioration from moisture, and made very strong and durable (without impairing its delicacy) by means of a superstructure of fine wire in the form of a truncated cone, which serves as a support for the diaphragm and wind absorber, and acts also as a multiple point transmitter, thereby increasing the power of the vibrations several fold. The truncated cone carries at its apex a brass cup, within which is located a cushion, which acts as an absorber of the roaring sounds caused by the wind in the ordinary acoustic

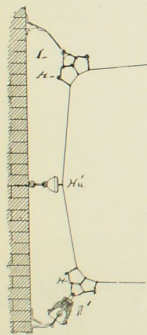


Fig. 2.

telephone. The line wire is attached to this cushion instead of running to the diaphragm, as is the case with other telephones of this class, this being one of the essential elements of the greater efficiency which is claimed for this system as compared with others. All vibrations must pass through this cushion before acting upon the diaphragm. The fact that the interposition of an absorbing cushion between the diaphragm and the line wire will eliminate exterior sounds without impairing the tones or articulation of the human voice is almost inconceivable. But the inventors positively claim that the vibrations caused by the wind, foreign vibrations caught up along the route, etc., from the transmitting telephone, coming all together to the receiving telephone, are there so acted upon by the absorber that only the sounds of the voice are audible, and experience in the use of the telephone bears out this claim. The line wire is a galvanized twisted steel cable coated with a metallic oxide which performs the dual role of checking the reverberations of the highly tempered steel wire and preventing rust. The combined angle-hanger, constant tension device and vibration absorber, does its work perfectly, and lines once adjusted with them are not affected by changes of temperature.

Fig. 1 is a perspective view with double ear tubes, magnets, call-bell and base-board. The telephone is rarely mounted in this manner, however, it being usually adjusted by screwing it upon a piece of gas pipe forced into a hole drilled in the wall. Fig. 2 shows the method of adjusting the insulators to the W shaped hangers, I showing the insulator adjusted in its normal position, and I' showing it connected to the hanger, reversed so that the in-

ulator may be kept dry during rain-storms. Iu' shows method of connecting the hummer or straight line insulator, and should be always adjusted so as to shed water, without wetting the interior. This, however, is only necessary when electric bells or magneto call bells are used for signaling. Fig. 3 shows another form of insulator suitable for lines without electric calls. Fig. 4 shows method of attaching a magneto or electric call bell to the line wire. The wire W should be wound tightly around the line and the wire going to the ground should be attached to a water or gas pipe when convenient, or a flat piece of iron sunk in the ground below the dry line. Fig. 5 shows method of cutting in a branch line into a main trunk line; several houses can thus be connected to one trunk line running along a street, and all be able to communicate with equal facility.

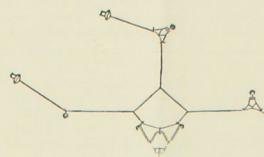


Fig. 5.

The practical working of the system has demonstrated its economy and convenience, and many railroad companies are removing electric telephones and substituting the mechanical system. We append a few testimonials of roads upon which it is in use:

## Lehigh Valley Railroad Company.

GENERAL OFFICE TELEGRAPH DEPARTMENT,  
MAUCH CHURCH, PA., Dec. 14, 1885.

G. F. SHAYER, President Consolidated Telephone Co.

Dear Sir: In answer to your favor of the 9th inst. I will say, that prior to my acquaintance with the "Shaver System" of acoustic telephones, I regarded every thing in the way of "non-electric" telephones with great disfavor. I thought them all needless, money-making devices. These views have from necessity been completely reversed by my experience with your system. We now have twenty of your instruments in use along the line of the road, and have thus been able to remove ten sets of Bell telephones, saving annually a considerable sum of money. The longest line we have yet tried is 1,850 feet, with a number of angles, some of which are quite sharp. The oldest line was erected in June last, and has never been in trouble since. These lines are used in the regular run of business, hence car numbers, weights, amounts of money and messages of all descriptions are daily trans-

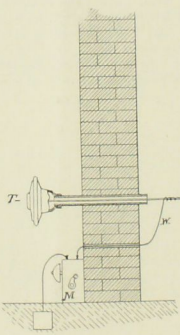


Fig. 4.

mitted and received over them, irrespective of moving trains, blowing whistles, running machinery, etc., just the same as Bell telephones are used under the same conditions. Wind and weather do not interfere, except that we sometimes find it necessary, in heavy rains or high winds, to stand closer and speak louder than ordinarily. I have no hesitation in recommending your instrument for all short lines.

J. W. LATTIG, Superintendent Telegraph.

## Pennsylvania R. R. Co., New York Division.

OFFICE OF SUPERINTENDENT OF TELEGRAPH,  
JERSEY CITY, N. J., Jan. 15, 1886.

G. F. SHAYER, President Consolidated Telephone Co.

Dear Sir: We have given your telephone a fair trial the past fall and winter, and find they give entire satisfaction in all weathers. We have one with five acute angles, one end of which is located in a telegraph office where eight telegraph instruments are in constant use, taking the place of an electric telephone and giving much better satisfaction. We hope to make a material reduction in our electric telephone service by their use.

W. ETTINGER, Division Operator.

## Lake Shore &amp; Michigan Southern Railway.

TELEGRAPH DEPARTMENT,  
TOLEDO, O., Nov. 23, 1885.

GEO. F. SHAYER.

Dear Sir: I have always been what you might call an enemy to acoustic telephones, partly because they have given us so much trouble by the wires crossing our telegraph lines and partly because I never saw one work satisfactorily for more than a month at a time. I frequently used your acoustic line built in 1883, V. T. Co., in Mr. Blackney's office, and was astonished at the ease with which I heard the articulations. Yours truly, WM. KLINE, Superintendent.

## Chesapeake &amp; Ohio Railway.

OFFICE OF SUPERINTENDENT OF TELEGRAPH,  
RICHMOND, VA.

G. F. SHAYER, President Consolidated Telephone Co.

Dear Sir: I am pleased to say that your instruments that we are now using at Clifton Forge (erected last year) are working very satisfactorily. While in New York I tested one of your lines that extends from Thirtieth street and Greenwich Avenue to Twelfth Avenue and Fourteenth street, that worked very well.

Yours truly, M. B. LEONARD, Superintendent Telegraph.

## New York, Lake Erie &amp; Western R. R. Co.

OFFICE OF SUPERINTENDENT OF TELEGRAPH,  
NEW YORK, Jan. 7, 1886.

G. F. SHAYER, President Consolidated Telephone Co.  
Dear Sir: The telephone lines you have built for us work admirably, and it is a comfort not to be bothered with batteries. We shall use them in our service wherever we can for short lines.

W. J. HOLMES, Superintendent Telegraph,  
Paterson, N. J.—C. T. Co.

## The Hammer Blow.

The Committee of the Master Mechanics' Association appointed to investigate the so-called hammer blow of locomotive driving wheels have made very little progress in their work. At the first meeting of the committee, in Philadelphia, parties interested in the Shaw locomotive offered to bear the expense of constructing a machine to ascertain the variation and magnitude of the pressure on the rails due to driving wheels being badly balanced. Mr. Shaw produced a sketch of a machine he thought would do the work. It was four wheels so set in proper framing that the driving wheels of a locomotive could rest on the treads of these carrying wheels. The latter were designed to revolve as the driving wheels moved, so that the wheels of an engine could be revolved at a high speed while the engine itself remained stationary. The journals of the carrying wheels were to rest on a hydraulic disk made to record the pressure.

A sub-committee consisting of Mr. Thos. Shaw and Professor P. H. Dudley was appointed to design an instrument that would make the required tests, and they were instructed to have the hydraulic cylinders directly under the treads of the wheels and to have each carrying wheel on a short independent axle. The sub-committee have now reported that it was impracticable to carry out the instructions they received, and here the matter rests.

## Millions Lost by the Strikes.

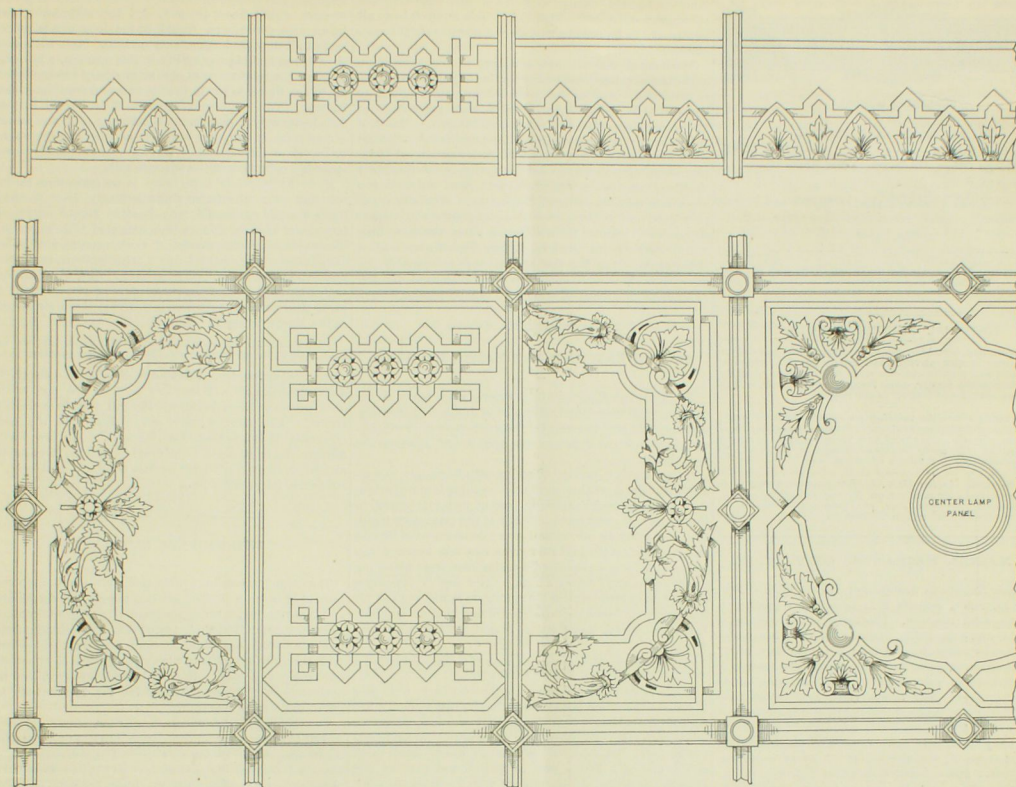
Bradstreet's reports that though 250,000 men have been on strike in this country at one time or another since April 24, there were at no one time more than 125,000 employees out, and that this number fell to 80,000 between May 12 and May 17, and to about 48,000 by May 20. The heaviest losses by the strike were from delayed or canceled contracts, and the building trades suffered most. The total loss on building contracts in ten cities is estimated at \$20,400,000. These losses have been most thoroughly reported, and are represented by most of the figures in the last column of the following table of the losses thus far reported:

	Wages.	Current business.	New business stopped.
New York City	\$300,000	\$300,000	\$2,000,000
Philadelphia	90,000	50,000	5,000,000
Smaller Pa. cities	70,000	50,000	4,000,000
Detroit, Mich.	97,000	25,000	850,000
Cincinnati	375,000	300,000	1,000,000
Milwaukee	495,000	350,000	1,000,000
New England cities	275,000	...	6,000,000
St. Louis	75,000	...	150,000
Troy, N. Y.	75,000	...	150,000
Washington, D. C.	54,000	...	3,000,000
Indianapolis	2,000	...	300,000
Pittsburgh	30,000	75,000	300,000
Louisville, Ky.	25,000	5,000	500,000
Coal strikes	200,000	500,000	Indeterminate
Chicago	700,000	700,000	3,000,000
Totals	\$2,802,000	\$2,105,000	\$24,800,000
Grand total			\$29,707,000

It is estimated that between \$3,000,000 and \$4,000,000 worth of manufactured articles have been ordered from Europe since the labor troubles began, all of which were heretofore manufactured in this country. Contracts of ten times this amount with European manufacturers are threatened by jobbers who are becoming importers. "They insist," says the Cincinnati Enquirer, "that there is a demand and they must meet it; the American manufacturer insists that he is helpless, that he can not supply them because of labor complications, and he can not comply with the demands of labor and meet European prices. There is every reason why capital and labor should come to a speedy understanding. The jobber who is anxious to patronize home industries should be encouraged. He can be encouraged by a settlement of labor difficulties."

In the car shops of the Chicago, Milwaukee & St. Paul Railroad at Milwaukee, Mr. W. E. Kitzinger, master car-builder, is building a very handsome new business car for the general manager. The car was designed by Mr. Baile, superintendent of the car department. It is divided into four compartments. At each end there is an observation room, and the middle portion is divided up into a parlor and kitchen. A small part of the parlor part is partitioned off into a private room for the general manager. All the inside of the car is finished in solid wood, no veneer being used. One observation room is finished in oak, the other in cherry. The parlor is finished in mahogany and the kitchen in oak. The head linings are plain, with a space above them to prevent convection of heat from the roof. Large plate-glass windows are used throughout. The space under the floor is packed with 2,000 pounds of mineral wool. Ordinary folding beds are used for sleeping accommodation. Hot and cold water is provided by pipes in all the apartments, and every other modern aid to convenience and comfort in traveling is provided.





DESIGN FOR INTERIOR DECORATION OF PASSENGER CARS.

Drawn by J. George Beckley, Green Island, N. Y.

The above style of decoration will present a handsome appearance if the lancet leaf designs on lower deck and the corner pieces of similar form on upper deck are sanded and either bronzed or gilded. Take No. 3 sand-paper, cut and shape nicely to pattern and glue to panel. When dry, fill in the usual way, taking care not to get any filling on the sanded parts. One light coat of varnish is sufficient to hold the size out before gilding. Stencil the darkest part of design asphaltum, and the lightest part blend in either with sienna or yellow lake, and edge with umber or Tuscan red. The striping, if a glaze, will look very well with an ultramarine and carmine glaze mixed. Varnish the whole, rub down and oil all the parts except sanded panels, which should be left glossy.

The cuts illustrate a new end-bearing designed to supersede the use of collars for restraining lateral motion on car and tender axles. The bearing as shown in Fig. 1, is recommended when new oil boxes are required. The piece *b b* is of cast iron, and *e* is a brass disk riveted to *b b*, both of which are held in position by the bolt *c* and by projections *c c* in the oil box. Fig. 2 has a cast iron disk *e*, to which a brass disk *b* is riveted; or the entire bearing can be made of brass in one piece, which makes it much lighter than when the cast iron piece is used. The bearing is held in position in the oil box by a bolt *c* which can be made round or square.

Both of these bearing have been in use on passenger cars, and locomotive tenders long enough to prove their superiority to collars, the narrow bearing of which is too small for the heavy cars that are now built, and wears away the ends of the brasses so rapidly that they have to be taken out because of too much lateral motion, long before they are worn out vertically.

Further information may be obtained by applying to Thomas Thatcher, Utica, N. Y., or to Walter Dawson, Scranton, Pa.

The car and machine shops belonging to the Chicago, Milwaukee & St. Paul Railroad at Milwaukee are employing about 1,600 men. During the recent labor troubles in Milwaukee the strikers terrified the management so much that these works were closed for several days.

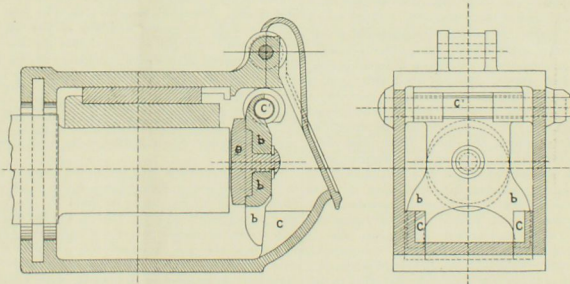


Fig. 1.

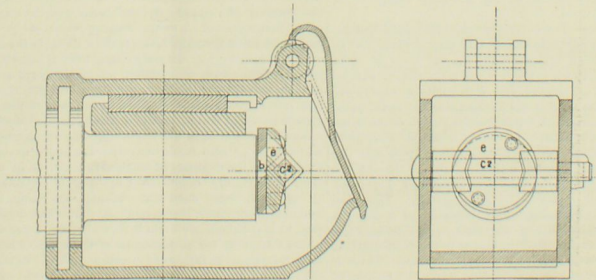


Fig. 2.

END BEARING FOR CAR AND LOCOMOTIVE TENDER AXLES.





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## EDITORIAL ANNOUNCEMENTS.

**Advertisements.**—Nothing will be inserted in this journal for pay, except in the advertising columns. The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.

**Contributions.**—Articles relating to railway rolling stock, construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.

**Special Notice.**—As the CAR AND LOCOMOTIVE BUILDER is printed and ready for mailing on the last day of the month, advertisements, correspondence, etc., intended for insertion, must be received not later than the 25th day of each month.

## THE MASTER MECHANICS' CONVENTION.

The Master Mechanics' Association will assemble at Boston, June 15, under auspices that promise to produce a highly successful meeting. The subjects for discussion are valuable and interesting, and most of them are under investigation by committees of men noted as hard workers. Some of the subjects have been frequently discussed, but the advance in mechanical engineering goes on so steadily that every year brings forth new discoveries, valuable inventions, improved methods, and the results of extended experience to enrich the records of the Association. No subject has been more frequently discussed than Boiler Construction, yet the report of every recurring year brings new and valuable facts about boilers to the attention of members, and the annual reports now contain the most important contributions that have been published in America on locomotive boilers.

Standard Driving Wheel Centers and Standard Sections of Tire is a subject that has been too long neglected. Taking it up at this meeting is a case of better late than never, and it is to be hoped that the association will agree to adopt standard sizes that will cover the leading dimensions of locomotive tires in use. Action of this kind would be a boon to tire makers, and would often prevent delays in supplying railroad companies with tires ordered on short notice. There are numerous centers of different dimensions for five feet wheels. Many of them differ only a fraction of an inch. Were the association to establish a standard for this center, it would lead the way toward uniformity, since many of the centers could be brought to the standard by a trifling reduction. Other sizes could and would be brought to standard in a similar way. Agreeing on a standard section of tire is scarcely of inferior importance to settling the exact sizes of wheel centers. The discussion of this point will, however, bring up conflicting views on the relative value of coned and cylindrical tread which may prevent agreement. Should discussion arise on this point, likely to prevent the adoption of a standard, an effort should be made toward settling on the proper depth of flange, for great diversity exists in this particular. The remaining subjects of Driver Brakes, Balanced Slide Valves, Best Material for Guides and Cross-heads, and Shop Tools and Machinery, are all of living interest and well worthy of the attention likely to be bestowed upon them.

The reports read on the various subjects under investigation are invariably interesting, and they seldom fail to shed new light on familiar subjects, but even of more value than the reports is the free and spontaneous expressions of individual opinion, and statements of experience that characterize most of the discussions. A weak point of the conventions is that this free discussion is too often stifled for want of time. We believe it would be a good thing for the master mechanics to adopt the plan now followed by so many other scientific societies, of having the papers printed before the date of meeting, and dispensing with the reading of them in the open meeting. This plan gives the parties engaging in the discussion of a paper a much better opportunity of speaking to the point, since they can refer as often as they choose to the words of the paper, and it leaves much more time for debate. There is seldom a master mechanics' meeting where the reading of some report does not take the greater part of an hour, and few take less time than half an hour. The tendency is for the room to get thinned out during the reading of reports, only those specially interested in the subject remaining.

Another desirable change would be a rule requiring the submission to a committee with power to reject all papers sent in by persons who are not members of the association.

The large accession of new members to the association at the last meeting indicates the continued popularity of the organization. Among the twenty-four names added to the roll at Washington, we noted a high percentage of the younger generation of master mechanics. Many of these are men who have enjoyed the benefits of a liberal scientific education combined with their mechanical training, advantages that were denied to many of the older members, who nevertheless have performed valuable services in developing railroad machinery. The advent of new blood and the advanced ideas of youth will impart strength and vigor to the association; but the new men will be very vigorous, indeed, if they display more zeal or industry in advancing the objects and interests of the association than has been constantly displayed by the older members, many of whom are rapidly passing away.

## MACHINERY AND THE LABOR PROBLEM.

The *American Machinist* in a recent issue takes a decidedly rosy view of the existing labor problem by insisting that the only sure panacea for the grievances of working-men is to be found in a more extended use of labor-saving machinery.

If this theory is correct, working-men have only to wait a little for the good time coming, as nothing is more certain than the continued increase and use of such machinery in the future. It must be admitted that the marvelous irruption of machinery into almost every department of human activity during the past fifty years has not lessened the wages of labor nor prevented working-men from obtaining employment and earning a living. Nor has it prevented them from contributing in the aggregate immense sums for the support of labor organizations of one kind or another. It is very natural, therefore, to reason as the *Machinist* does, that

"There is no exception to the rule that the more labor-saving machinery is used the better labor gets paid."

While labor in this country has thus far been well paid in spite of the progressive cheapening by machinery of the cost of manufacture, it is a question worth considering whether the "no exception" rule will continue to hold good indefinitely. Hand-labor of almost every kind, both skilled and unskilled, is sure to be superseded more and more in the future by machinery which will do the work quicker, cheaper and better. This being the case, how is the labor thus superseded to be provided for so as to better the condition of the laborer, which means, of course, better pay than he can get in other countries where the advantages of machinery are less appreciated? To absorb the increasing products of machinery we have to rely on the starting of new industries and the opening of new markets at home and abroad. But is this reliance always to hold good in the face of the increasing numbers of the wage-earning classes and the rapid and inevitable introduction and manufacture of labor-saving machinery among all industrial communities for the purpose of abridging hand-labor and cheapening production?

"We need not be reminded," says the *Machinist*, "that toil is still arduous, but there are hundreds of improvements yet to be made by which it may still further be lightened. Machinery must be called upon in the future to do much of the work now done by hand."

There is no question as to the improvements yet to be made, nor is there any doubt that much of the work now done by hand will be by and be done by machinery. It may be suggested, however, that if the fertility of invention and the prodigious increase of labor-saving machinery in the past have not lightened the workman's toil, how soon will that much-desired result begin to be realized? Machinery saves labor by dispensing with hand-labor in the manufacture of innumerable products, but the labor thus dispensed with cannot relapse into idleness, but must still toil as hard as ever to support existence. It is estimated that there are now in the United States a million and a half of idle and unemployed men, and the question is whether each and all of the mighty mass of laborers, employed and unemployed, can make a living in the future with less toil, as they certainly ought to do if labor-saving machinery keeps on saving labor. A pretty large portion of them evidently think they ought to begin to live with less toil now, or there would not be such a universal clamor for eight hours, a movement which the *Machinist* implicitly attributes to the increasing use of machinery, which it says "also tends to shorten the hours of labor." Considering the quantity of machinery there is in operation, it certainly ought to have begun by this time to shorten, not only the hours, but the weeks and months of labor, if it is labor-saving. But does it do this, or is the tendency to do it very obvious except in the present demand for a reduction of the hours of labor in order to obtain an apparent increase of pay? In this demand, however, there is evidently a good deal of self-delusion. Suppose a reduction to four hours were asked for instead of eight, and suppose the demand should every where be conceded without interruption to business or reduction of wages. The result would inevitably be a corre-

sponding increase in the cost of production, which consumers would have to pay, and the eight-hour men being also consumers, would in the long run be out of pocket all they had apparently gained. And with such short hours and big pay ruling in this country, who could estimate the mightiness of the stampede of foreign laborers to our shores to put in their sickles and reap the golden harvest? The eight-hour problem differs from that of four hours only in degree. A shortening of hours means a shortening of pay, just as much as lowering the water-line level on one side of a pond means an exactly corresponding reduction on the opposite side.

If, as the *Machinist* says, there is no exception to the rule that the more labor-saving machinery there is used, the better labor gets paid, why has the recent enormous increase of such machinery been attended with increasing discontent among the masses of working-men, until it has culminated in innumerable labor organizations, protective associations and a carnival of strikes? And why is it that such a large portion of the wage-earning classes need to make the enormous sacrifices involved in these strikes, if as the *Machinist* says:

"America is the highest-priced country for labor, and we use machinery to an extent unsurpassed by any other country."

It would appear from this that working-men collectively do not realize how well they are paid, or else a considerable portion of them do not get the full benefit of the machinery. Ultimately we have got to deal with the facts, no matter what becomes of the theories. The law which governs the relations of supply and demand is immutable, and labor, like everything else that is bought and sold, is subject to its jurisdiction.

## THE COUPLER QUESTION.

The complications in which this question is involved, instead of being simplified are becoming more formidable and bewildering. State legislatures, railroad commissioners, the Car-Builders' Association and individual railroad companies, are taking action, each in their sphere, with the view of reducing the existing chaos to something like system and order. It must be said, however, that the outlook is not promising, mainly for the reason that too many cooks spoil the broth.

The Car-Builders' Association have for years past been looked to as the only authoritative umpire in the matter. As an association, they were expected to designate a certain small number of coupling devices out of a thousand or more, as being mechanically the most perfect, and then after fully testing the selected few in regular service, pick out one of them as best adapted to meet all the conditions of diversity in couplings already in use and recommend it as a standard. The association have not done this simply because they were unable to do it. Nor can they do it now. The elements are too conflicting and irreconcilable. Let us glance for a moment at the past. For several years previous to 1879, the subject of standards for draw-bars and couplers was discussed in a hap-hazard sort of way at the annual meetings, but at the Chicago meeting in June 1879, the committee on draw-bars ventured to name in their report three devices as being worthy of consideration, but with the saving-clause that the committee did not wish to be understood as recommending either of them as standards. The sensitiveness of the members in regard to the mention of patented devices in the reports of committees was at that time very great, and the discussion of the report raised a tempest of feeling so violent that the air in the hall was quite sulphury while the ebullition lasted.

The subject of couplers was then avoided, or permitted to languish rather, until the meeting at Saratoga in June 1884, when the association, under the spur of threatened compulsory legislation, recommended the roads to experiment with seven devices which were designated by name. Then came the special meeting at Fortress Monroe in June 1885, of a few managers, superintendents and one railroad commissioner, to discuss the subject in conjunction with the members of the Car-Builders' Association. The discussion was fruitless, except to initiate the trial tests at Buffalo last September, which resulted in the selection of twelve couplers by the Executive Committee to be put on probation until the first of May.

This brief but comprehensive summary of the action of the Association on the coupler question up to date, shows how little has been accomplished in the way of practical results. The effect has been to invite legislative action, and it now looks as if the Association would have to surrender its rightful jurisdiction in the matter to other and more potent agencies of a compulsory kind, who may perhaps act with more vigor but with less discretion. Following the example of Massachusetts, the legislature of New York in 1884 passed a law requiring all freight cars built or purchased by the railroad companies within the State after July 1, 1886 to be equipped with automatic couplers that will not make it necessary for a person to guide the link, lift the pin by hand or go between the cars, and the Railroad Commissioners of the State are to make a selection of the couplers on the 15th of June, only fifteen days before the law takes effect. The legislature of Michigan has also passed a similar law, which also goes into effect July 1,



and the Railroad Commissioner of that state has already made a selection of seven couplers to be used in accordance with the requirements of the law. Only two of the seven are among those approved by the Massachusetts Commissioners in 1884, and only four of the seven are among those selected by the Executive Committee at Buffalo, leaving three that have hitherto received no official endorsement. Here, to be sure, is complication enough, and it remains to be seen whether the complication is to be still more complicated by the selection to be made this month by the New York Commissioners, and also by the Executive Committee in their forthcoming report upon the twelve couplers selected at Buffalo.

Although the Car-Builders' Association have hitherto accomplished little or nothing to further the general adoption of practically interchangeable couplers, it remains to be seen how much will be accomplished in that direction by compulsory legislation. Our own opinion is that legislative interference will ultimately produce a worse muddle than ever. There are too many distinct and independent legislatures and boards of commissioners, and it is not likely that they will act in any more harmony in prescribing what couplers shall be used by the roads in their respective States, than so many trunk lines of road, to say nothing of their manifest incompetency to deal with intricate mechanical problems. However urgent may be the need, it is safe to say that local legislation will never bring about the adoption of a universal coupler, or even a plurality of couplers that are practically interchangeable with one another and with those already in use on the 700,000 or more freight cars in the country. The evil to be remedied is not local, but ramifies through all the network of a vast interchanging traffic which is in the nature of the case independent of State lines and co-extensive with the continent. The solution of the problem, as it seems to us, must be left to the slow but sure process of the survival of the fittest.

#### THE RAILROAD BUILDING OUTLOOK.

The *Railroad Gazette* reports the new construction (main track only) up to May 15, to be 751 miles as against 494 at the same time last year, showing an increase of 317 miles in four and a half months of 1885. The total new construction of main track in 1885 was in round numbers 3,100, and a continuance of the above rate of increase would bring the present year's mileage up to 5,763.

Should the disturbances caused by the labor agitation have an unfavorable effect upon general business during the rest of the year, the new mileage may possibly fall below these figures. But in view of all the conditions, financial and otherwise, under which the new roads have been projected, such a result is not probable. The chief activity is at the West and Northwest, where three great leading lines are preparing to construct in the aggregate 1,300 miles of extensions and feeders. Numerous other enterprises, under the auspices of prosperous existing lines, are also under way in the same region, with the view of securing new traffic or to compete with rivals. The most favorable indication in connection with these preparations, is the fact that the new construction is not dependent to any great extent upon a buoyant speculative market for converting the securities. The new lines have become a necessity to meet the demands of a legitimate and growing traffic, and if no financial kiting is required to raise the funds, they may as well be built when the prices of material and labor are lower than they would be in a year of rampant speculation. The new construction, resting as it does upon a sound basis financially, justifies the expectation that it will reach as high as 6,000 miles at the end of the year, or nearly double what it was in 1885. The expenditure involved will be large, and the outlay can hardly fail to have a stimulating effect upon business generally in spite of the drawbacks incident to the labor strikes.

#### COMMITTEE CIRCULARS.

Any one who is familiar with the style of circulars sent out every year by committees of the Car-Builders' Association previous to its reorganization, can hardly wonder that the information so obtained was meager and unsatisfactory. The questions in some of the circulars were so numerous that they had to be numbered, and each was so framed that it could be answered with a "yes" or "no," or a "we do" or "we don't," a blank line under each being left for the purpose. This labor-saving mode of obtaining information as a basis for committee reports was not a success, and many of the reports were from year to year little more than a summary of questions and replies, the replies being so conflicting as to leave the problems upon which information was sought more unsettled than ever; and whether the committees were "continued another year" or new ones appointed, their next reports often differed in no respect from the previous ones except in their dates. There were, of course, very obvious reasons for the general neglect to reply to circulars, as well as for the unsatisfactory information furnished by those who did reply to them. Many of the members of the association, in the absence of tests, records and statistics, had no settled views of their own, and others who had formed definite opinions were reluctant to commit themselves

publicly in black and white, for fear of incurring the displeasure of their "superior officers" or of subjecting their reputation as mechanics to possible risk.

One of the objects of the association in taking its new departure in 1882 was to get out of old ruts, and we notice that its former reliance upon circulars for getting information has been to some extent abandoned. The questions sent out now are less numerous, and are framed more with the view of eliciting facts than mere opinions. The committees also in preparing their reports rely more on their own resources. Every member of the association is presumed to be a practical car-builder, whether he is one or not, and to have well considered opinions in regard to all essential points in car construction. There would, in such case, seem to be no reason why the combined experience of three or four members of this sort should not enable them, as a committee, to make a good report without putting on the witness stand a large number of unwilling witnesses, as the old style of circulars virtually did. What is absolutely the best in respect to standards and methods can not be determined by preponderance of opinion. Car builders think differently upon many mechanical questions in respect to cars, and about which there should be entire unanimity—the comparative merits of rigid and swing-motion trucks and of iron and steel axles, whether brakes should be hung to the truck frame or car body, or put outside the wheels or between them, or on one or both trucks, and at what point between six feet and as "close together as possible" should be the length of wheel base, etc. What is absolutely best in respect to these and numerous other problems involved in car construction, cannot be determined by voting or by a canvas of individual opinions. No appliance or method is necessarily best because a majority of votes have been cast for it, but because it is best independently of the voting.

That there is no great loss without some small gain, is an axiom the truth of which has been verified in all human experience, and the losses resulting from the labor strikes are no exception to the rule. The widespread agitation, the violence, law-breaking, sacrifice of life and interruption to business, have caused the labor problem to be universally discussed in the newspapers and in business and private circles. The press has, almost without an exception, disseminated sound and conservative views upon the subject by refuting the specious arguments and exploding the dangerous fallacies of the professional agitators. These views have been read with avidity by all classes of people and have had a most salutary educational influence. Thousands who have been swayed by one-sided reasonings have by this time been led to think and investigate for themselves. They have learned more about individual rights, the supremacy of law and the principles of government than they ever knew before, and they are not likely to forget what they have learned. Large numbers of the rank and file of the crudely organized Knights of Labor have already begun to assert their manhood by refusing any longer to obey like mercenaries the word of command. The illusion is fast being dispelled, that all the wage-workers in the land can be combined in one mighty organization, with power to bring great branches of industry to a stand-still at the beck and nod of the Grand High. It has been discovered that both employers and employed are laborers in the full sense of the word, and that there is an interdependence between them which no theories can do away with, and that forcible interference with the individual rights of the former, when countenanced or connived at by the leaders of labor organizations, enlists at once a host of turbulent and law-defying camp-followers, bent only upon plunder, pillage and anarchy. The great strikes have not therefore been an unmixed evil, but will result in benefit to the cause of labor in ways unlooked for by the strikers.

We are not particularly warm admirers of the system followed on most of the Gould lines, of treating the employees strictly as articles regulated in value by the rigid principles of supply and demand, but we are convinced that the head of these roads receives a great deal of abuse for actions that others are guilty of. During the recent troubles with railroad strikers we happened to hear particulars of the true inwardness of the difficulty that arose some months ago between the engineers and the management of the Elevated Railroads of New York. In the beginning of that dispute, Mr. Hain, the General Manager, agreed to meet a committee of the engineers to discuss the grievances they complained of, but before the time for meeting arrived an order was issued suspending the operating of the Second and Ninth Avenue lines. The action looked like a breach of faith on the part of the General Manager, and Mr. Hain and Mr. Jay Gould became immediately the objects on which the full vials of wrath were poured by the press and public of New York. Yet Mr. Hain was from the first anxious to conciliate the men, and vigorously opposed the action taken, but his counsel was rejected in the board-room at the instigation of Mr. Russell Sage, who professed to be willing to sacrifice half his fortune to beat the men. Mr. Gould supported Mr. Hain as soon as he could be reached. With all this, Mr. Sage is spoken of as a friend of the employees.

We print on another page the rules and programme agreed upon by the committee of the Master Car-Builders' Association for governing the tests of freight train brakes to be made at Burlington, Ia., commencing July 13. Although nearly a year will elapse before any report of the final results will be made, it is a satisfaction to know that the committee, and the companies representing five, and perhaps six continuous train brakes, have come to a mutual understanding as to the details of the tests. It is to be hoped that nothing will occur to prevent the completion of the tests according to the arrangement, and that whatever the result may be, the competitors one and all will have no occasion to complain of unfairness. The need of decisive action is becoming more urgent every day, but it is also needful that such action should not be so precipitate as to defeat its own end. Freight train brakes have become so indispensable that their use is a foregone conclusion. If nothing comes of these tests after being continued for a period of eight months, and if the action of the association shall thereafter be dilatory and indecisive, the compulsory power of the law may be interposed to expedite matters in much the same way that it is now being brought to bear in respect to couplers.

#### BOOK NOTICES.

RAILROAD SUPPLIES, PAY ROLLS AND EMPLOYEES: By Benj. Norton, Purchasing Agent of the Long Island Railroad: Pages 95. This little book deals with the three important features of railroad management named in its title, in a way that should commend it to the attention of every one who has anything to do with the practical operation of railroads. Although much of what it contains has been said before, it may be questioned whether it has been said so clearly, concisely and pointedly, or in so compact and readable a form as in this volume. The contents are divided into chapters, as follows: The Purchasing Agent, His Qualifications and Province; The Storeroom and Storekeeper; Contracts for Special Supplies; Experiments—Oils, Paints and Varnishes; Car Wheels and Axles, Iron and Steel, Metals and Lumber; General Supplies and Old Material; Pay Rolls; Employes, their Government and Treatment. In what he says upon these subjects the author writes apparently from a thoroughly practical stand-point. A great many suggestions are made, the value of which every purchasing agent will appreciate, relating as they do to the innumerable small economies that are so apt to be overlooked, and the false economies that are so often practiced. The chapter on General Supplies and Old Material, is an example of the author's ability to compress a great deal of information into such small space that the reader can grasp it without wading through a sea of words.

A PRACTICAL TREATISE ON GEARING: Brown & Sharpe Manufacturing Co., Providence, R. I., pages 121, size 9 x 5 1/2 in., including margin. Price, post paid, \$2.10. As stated in the preface, this book is intended for those who would like to know how to construct gear wheels, but whose duties do not afford them sufficient leisure for acquiring a technical knowledge of the subject. The contents are admirably arranged, and contain a complete elucidation of the principles involved in this branch of mechanism, with detailed explanations, and numerous illustrations in the best style of engraving. It is a thoroughly practical treatise on a technical subject, and its usefulness will be appreciated by those who have anything to do with the construction and management of gearing. The volume is tastefully and substantially bound, the paper and letter press of the best quality, and reference to any portion of the work is made easy by a table of contents, an analytical index and marginal notes.

MR. E. M. REED has resigned the office of General Superintendent of the New York, New Haven & Hartford road. He will still retain the position of Vice-President of the company. He was made superintendent of the old Hartford & New Haven road in 1853, and when it was consolidated with the New York & New Haven he became General Superintendent of the consolidated lines, from which position he now retires in order to obtain needed relief from its duties.

IN England the Metropolitan Railway Company have determined to follow the London & Northwestern and Midland railway companies, and adopt steel sleepers.

MR. F. D. CHILDS, well known as superintendent of the Hinkley Locomotive Works, in Boston, has been appointed superintendent of the Canadian Locomotive Works, Kingston, Canada.

MR. ROBERT HARDIE, well known as a designer of pneumatic locomotives, has been appointed superintendent of the New York Locomotive Works, at Rome, N. Y. Mr. Hardie was for several years consulting engineer for John Elder & Co., Glasgow, Scotland.

THE Pennsylvania Railroad is making a small experiment in iron ties by laying about two miles of them on the main line in the Philadelphia yard. They are of inverted channel-bar section, and are made by the New Jersey Steel and Iron Company, of Trenton, N. J.

THE Master Car-Builders' Association will hold their annual convention at the International Hotel, Niagara Falls, N. Y., commencing June 8. Members or others desiring to secure hotel accommodation in advance can do so by addressing A. H. Gluck, International Hotel, Niagara Falls, N. Y.

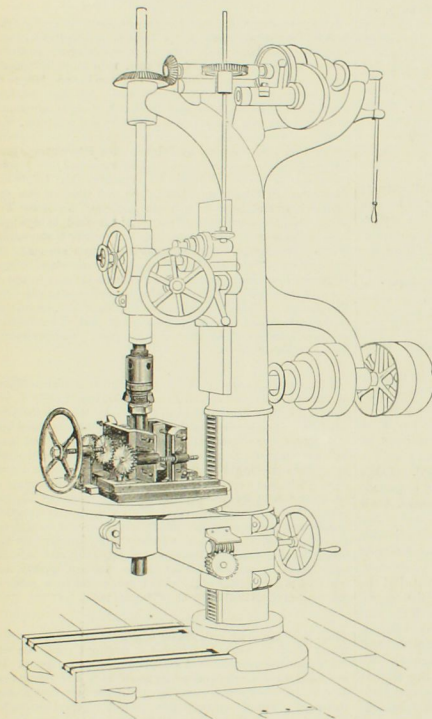
THE committee of arrangements for the annual convention of the Railway Master Mechanics' Association to be held at Boston, commencing June 15, announce that the Quincy House in that city will be the headquarters of the association, and that the charge for accommodation will be \$2.50 per day for each person.



## A Case of Infinite Grit.

Several months ago we mentioned that a prominent western railroad company, having instituted an inspection of all the train men for the detection of color-blindness, it was found that one of the oldest passenger engineers could not read or write. The result of this discovery was that the man was taken off the road at once, and notified that he could have a switch engine to run. Instead of accepting this oblique promotion, he asked and received leave of absence for three months. Then he went home, got the assistance of a teacher, and began laboring to acquire a knowledge of reading and writing. This was done so vigorously that at the expiration of his leave he wrote a very respectably penned letter to the master mechanic intimating that he was ready to take his engine.

Two kinds of fences have been used on the Northern Pacific to keep the snow from drifting into the cuttings. Permanent fences are the more lasting, but movable hurdles are more convenient for moving back when their lee side has filled up. The objection to the latter fence is, that it is liable to go all over the prairie—generally on the back of a squatter.



Car-Boring Attachment.

The device shown in cut is a very simple, effective and inexpensive way of boring car axle brasses. A chuck arranged to be fastened to the table of an ordinary drill press with automatic feed and quick return holds the brasses to be bored, and by simply turning the hand-wheel they are brought together and firmly held in place—a double adjustable cutter bores two brasses at a time—the brasses being less than a half circle, strips are placed between their faces. These strips or parallels are held separately by the set screws, and need not be disturbed when once adjusted for certain sized boxes. When different sized boxes are to be bored, then other strips are required. The operation of setting the boxes is as simple as screwing up a vice. The two jaws are adjustable and move toward the centre at one time, firmly holding the brasses against the strips. Below the chuck is a bearing for cutter-bar, which is kept free from chips and dirt by a rubber ring, giving a good opportunity to oil. This cutter-bar is fitted into the taper-hole in end of drill press spindle. Through it a slot is made and two cutters with ends rounded are made to form a hinge or pivot for each other. The end that does the cutting is shaped so that a good cutting edge is made when the cutters are set close to bar for a small hole or extended for a large one. They are designed to bore all sizes of car axle brasses with one set of cutters. The ends of the cutters are thickened to have a grinding or sharpening surface, and are sharpened by grinding on the face of them. They are extended or contracted by a nut and washer, top and bottom of cutters, that admit of very fine adjustment. This device can be very quickly put in place and at work, and when once adjusted can be operated by unskilled labor. By having ring gauges on the bar hung up over the cutters, they can be often tried and the cutters adjusted to bore standard sizes.

Manufactured by the L. B. Flanders Machine Works, Pedrick & Ayer, proprietors, Philadelphia, Pa.

## California Redwood.

The redwood forests of this State are now becoming very valuable, and notwithstanding the great waste which has gone on for years, there are still immense tracts of these valuable trees. The wood is most excellent for building purposes, and has been used for buildings all over the coast. Lately a market has been found for the wood in the East, where it is used for interior decorating purposes, the color and grain being much admired. We do not see much unpainted redwood in this State, but elsewhere it is highly appreciated. Shelled and varnished it is very beautiful, but oil should never be put on it, as it turns black under such treatment. Bookcases, sideboards and ornamental furniture can be made of it, though such things must be made to order, the manufacturers generally ignoring this wood for such purposes here, on account of its softness.

The California redwood is highly thought of outside of this State. Vessels going to the islands of the Pacific always carry large deckloads, the planks being as good as gold in the South seas. It is also being shipped to England, and there used as a decorative or fancy wood. When the costly English steam yacht of Sir Thomas Hesketh, the "Lancashire Witch," was in this harbor a few years since, yachtsmen who boarded her were surprised to find her elegant cabins, etc., all furnished in California redwood and Oregon pine. It was considered a choice wood, and the finish given it by the English workmen made it have a very handsome effect.

The foreign shipments of this wood are now increasing very rapidly. From Humboldt Bay alone during the past year they shipped 7,670,000 feet of redwood lumber, as well as quantities of shingles and moldings, the value of which was \$180,000. These cargoes went to Honolulu, Sydney, Calcutta, British Columbia, Mexico, Valparaiso, etc.; most of them went to Sydney.

The California redwood trade in 1883 amounted to 113,000,000 feet, and the consumption was 105,200,000. The redwood belt of this State is about 30 miles wide and 400 miles long, running from Monterey Bay to Crescent City. It is all on the western slope of the Coast Range. The wood is very durable and is well adapted for ties and posts. For shingles and shakes there is no better wood. It contains little or no resin and burns slowly. The curled redwood, when polished and varnished, is handsomer than rosewood. The lumber dealers estimate there is still standing upwards of twenty-six billion feet of this lumber in this State.—*Mining and Scientific Press.*

## Farewell to the Frog.

The number of railroad employees who are killed and crippled by catching their feet in frogs and being run down by moving trains is much larger than any one would suppose. The papers almost daily contain accounts of such casualties. Misplaced switches are also the cause of a great number of accidents on railroads. Yesterday a number of railroad officials assembled at Ludlow to witness a test on the Southern Road of the Curdin automatic frogless switch. The Southern people had a train made up of an engine, baggage-car and two passenger coaches. The switch was first set for the side track. The train ran up the main track, and the wheels set the switch and crossing for the main track without damage to the train or track. The switch was again set for the siding, and the train run in on the side track. At that moment a long freight train came up the main track. The switch was thrown for the siding. The front wheels of the engine on the freight set the switch for the main track, and the entire train passed along the main track as smoothly as if it had never struck a misplaced switch. The engine and cars were run through the switch several times, it being set wrong, and it always performed its work. The device differs in almost every particular from the frogs and switches now in use, and is absolutely auxiliary to the main track, but does not change the construction, strength or form of the main track. All the parts of the switch and crossing that are movable are so arranged as to form a continuous rail for the siding, and the wheels of the passing train can pass from the main to the side track without jolting. When the switch is set for the main track all the parts of the switch and crossing are thrown entirely away from the main rails, and leaves the main track clear and unbroken. In case the switch is left thrown for the siding through carelessness, a device is provided for the automatic opening of the switch by the contact of a passing train, which sets it entirely clear of the main track.—*Cincinnati Enquirer.*

Some men never think of answering a letter, however important it may be. They think it just as well to wait until they see you before making a reply.

## Western Railway Club.

At the May meeting of this club a committee was appointed to arrange for the combined action of members attending the Master Car-Builders' and Master Mechanics conventions. A committee was also appointed to arrange for a new place of meeting, and to decide on a subject for discussion at the next meeting. No more meetings will be held till September. The club has been suffering from malaria this season, but it is confidently predicted that the members will come together in the fall to find the club healthy and vigorous.

ELLIS "Brunswick" steel-tired wheels are to be put under 32 six-wheel truck coaches that are now being built for the New York Central Sleeping Car Co., at Pullman, Ill., and this company has also ordered these wheels for 50 coaches that have been running with cast-iron wheels. Brunswick wheels are also to be used under 32 coaches that are being built at Wilmington, Del., and Troy, N. Y., for the New York Central & Hudson River road; and the Sonora R. R. has recently ordered these wheels for ten coaches.

THE PRATT & WHITNEY Co., Hartford, Conn., have bought the machinery, fixtures and tools of The Hartford Tool Co., and will continue the manufacture and sale of their valuable threading, turning, shaping, cutting-off and boring tools, center-reamers, dividers, straight-edges, etc., under the supervision of Mr. J. E. Woodbridge, late manager of that company.

THE GEO. PLACE Machinery Co. have received the contract for equipping the shops of the New York Central Sleeping Car Co., at East Buffalo. They will put in Bement, Miles & Co.'s machine tools and J. A. Fay & Co.'s wood-working machinery. The company has also contracted to equip the shops of the Brooklyn Elevated Railway Co. with engines, boilers and machinery.

The demand for the Dickson steel wheel is rapidly growing, so that an enlargement of the plant for their manufacture has become necessary. The company has just completed a shipment for 8 coaches to the New York, Lake Erie & Western, and for 15 cars of the Delaware & Hudson Canal Co., and several sets for the Philadelphia & Reading and Fitchburg roads.

The firm of Thayer, Howell & Co., manufacturers of journal bearings, anti-friction metals, etc., at Milwaukee, Wis., has been dissolved, Mr. A. S. Howell having sold his interest to the new firm of F. W. Thayer & Co., by whom the business will be continued.

## Our Directory.

We note the following changes since our last issue. Our readers will do us a great favor by giving us prompt notice of any changes that may come to their knowledge or of any errors that may be noticed in our list:

*Chicago & Indiana Coal.*—This company is the successor of the Chicago & Great Southern.

*Chicago & Iowa.*—James Morris is appointed Acting Master Mechanic in place of Henry S. Bryan, who has gone to the Chicago, Burlington & Northern.

*Chicago & Northwestern.*—C. A. Schroyer has been appointed Assistant Superintendent of Car Department. He was formerly in the Indianapolis shops of the P., C. & St. L.

*Fall Brook Coal Co.*—George R. Brown has been appointed General Superintendent of the roads operated by this company, vice A. H. Gorton, deceased.

*Florida Southern.*—J. A. Larnard has been appointed Superintendent in place of J. D. Hollister, resigned.

*Louisville & Nashville.*—C. R. Barnhart has been appointed Superintendent of the Louisville, Cincinnati & Lexington Division, in place of J. G. Metcalfe, transferred; and P. T. Downs, Superintendent of Louisville Division, vice Geo. E. Evans, transferred.

*Minneapolis, Sault Ste. Marie & Atlantic.*—H. W. Hamilton (late Superintendent of Telegraph) has been appointed General Superintendent.

*Missouri Pacific.*—G. W. Dalby has been appointed Superintendent of the Western Division.

*New York, New Haven & Hartford.*—O. M. Shepard has been appointed General Superintendent in place of E. M. Reed, resigned.

*New York, Providence & Boston.*—J. W. Miller (late of the St. Louis, Fort Scott & Wichita) has been appointed General Manager.

*Northern Pacific.*—M. C. Kimberly has been appointed Superintendent of St. Paul Division and Little Falls & Dakota Railroad; S. R. Anslie, Superintendent East and West Minnesota and Wisconsin divisions, and Northern Pacific, Fergus & Black Hills Railroad; F. W. D. Holbrook, Superintendent Yellowstone Division; and F. L. Richmond, Superintendent Montana Division and branches.

*Pooria, Decatur & Evansville.*—This road is now operated by the Evansville & Terre Haute. W. D. Ewing has been appointed General Manager.

*Worcester, Nashua & Rochester.*—This road has been leased to the Boston & Maine, and will hereafter be known as the Worcester, Nashua & Portland Division.

## Employment.

WANTED.—By a young married man, a situation as Foreman Car-Builder; has had eleven years' experience in building and repairing passenger coaches and freight cars, and has served for some years as Master Car-Builder for a leading railroad. Can furnish good references. Address "W. N. C.," office of NATIONAL CAR AND LOCOMOTIVE BUILDER.



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How natural it is to try to get *something* for *nothing*, and expect satisfaction in the use of materials that look well, but have no real merit. This is exemplified in painting cars as much as anywhere. The Perfect Method Paints manufactured by us insure durability and saving of time otherwise lost in repainting, or lost by decay of the wood and rust of the iron when the paint has perished, as most of the ordinary paint soon does.

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THE AUTOMATIC BRAKE will, in consequence of its quick application, stop a train in the least possible distance.

THE AUTOMATIC BRAKE on freight trains, as in passenger service, applies itself instantly to all parts of the train in the event of the train breaking into two or more parts, a feature of great importance in view of the statistics published in the *Railroad Gazette*, which show conclusively that a majority of the collisions are caused by the breaking in two of trains. (See *Railroad Gazette*, Feb. 12, 1886, page 113.)

THE AUTOMATIC BRAKE also applies itself to every car in the train, in the event of any accident to the brake apparatus of such a nature that it would render any non-automatic continuous brake inoperative.

THE AUTOMATIC BRAKE can be applied from the rear or from any portion of the train, if desired.

THE AUTOMATIC BRAKE will effect an increase of at least twenty-five per cent. in the efficient value of freight rolling stock, owing to the quicker time that can be made on the road, and the avoiding of delay at stations and sidings. Freight trains carrying perishable goods are being daily run on passenger schedules.

THE AUTOMATIC BRAKE, applied to freight cars, avoids the flattening of wheels and effects a yearly saving, in this item alone, nearly equal to the first cost of the apparatus.

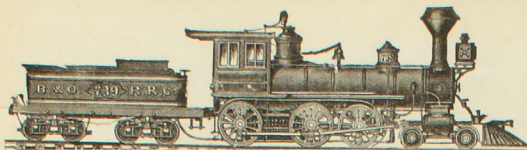
THE AUTOMATIC BRAKE will prevent a greater part of the accidents to freight trains which form so large an item of expense in railway management.

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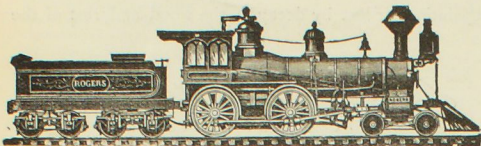
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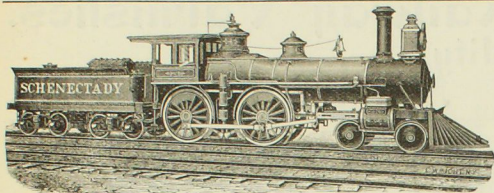
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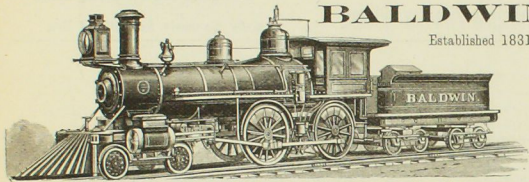
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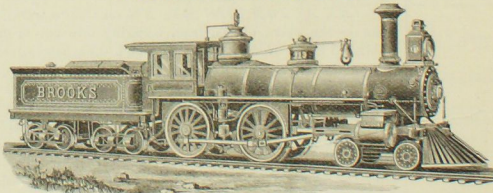


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